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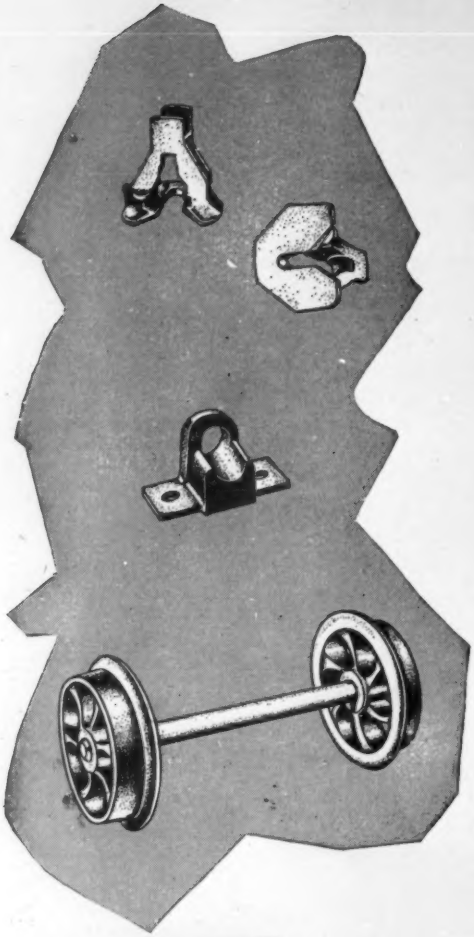

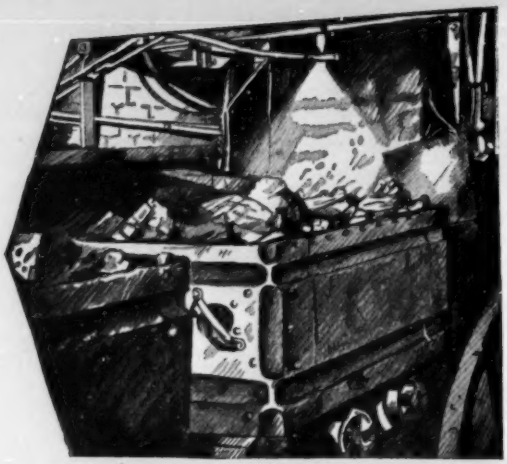

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IRON AND COAL
TRADES REVIEW

Vol. 180 June 24, 1960 No. 4,797

Coal in the News

AN eminent public figure of a past generation is reputed to have remarked that he did not care what the newspapers said about him so long as they said something. If there is any reason at all in such an attitude—and we can see the point—those people responsible for the conduct of the coal industry of this country ought to be well pleased with the publicity given to coal in recent weeks. It is a recognition of the important part coal plays in the economy of the nation that it should hit the headlines so often. Take, for instance, the excitement which has been created by the new appointments to the National Coal Board announced last week by the Minister of Power. Coal is a basic industry. Without the coal which is found in such abundance beneath its soil Britain would be a poor country. The Industrial Revolution would have been impossible without coal; our great engineering industries could not have been built up to their present eminence and prosperity; our standard of living would not be as high as it is today, and certainly we could not have waged, and won (?), two great wars. It is of vital concern, therefore, that the right men should be found to run this great industrial enterprise. and gratifying that the public, through its newspapers, should take so much interest in the appointments.

One wishes, though, that there could be found more often in newspaper articles a recognition of the fundamental part coal plays in the affairs of the nation, rather than the concentration on ephemeral aspects of the news with which we are so constantly confronted. Most of the comment on the appointment of Mr. Alfred Robens to succeed Sir James Bowman as chairman of the National Coal Board has been concerned with personalities and politics rather than the immense task he will be called upon to undertake; with Mr. Robens's acceptability in various quarters rather than the vital question of whether he is the right man for the job. Great play has been made with the fact (if it is a fact) that this is a £10,000 a year appointment. Nobody seems to have questioned whether a taxed income of £10,000 is adequate for the top man in an industry which has a turnover of some £1,000,000,000 per annum. It certainly would not be regarded as adequate in any other industrial or trading enterprise approaching the size of the coal industry. The concern of the public should be with the job first and the man second. First assess the task to be done and then find the man to do it. Having found the man, whether he is acceptable to everybody and to all political parties, whether he comes from within the industry or from without, are minor considerations, real enough in their way, but of no consequence in relation to the main need, which is to fill adequately a post which calls for qualities of courage and ability of no mean order.

The responsibility of appointing a successor to Sir James Bowman rests with the Minister of Power. The Minister having made his choice, the coal industry as a whole accepts it, and its personnel will serve loyally under Mr. Robens and give of their best as they have done under other chairmen. Many will think that Mr. Richard Wood has chosen wisely and well. He could not satisfy everyone—he was not indeed called upon to do so—and neither he nor Mr. Robens should allow themselves to be diverted by premature panic statements about denationalization or by complaints about an "outside" appointment. Somebody would be displeased whoever was appointed. Choose a man from outside and the cry goes up that he knows nothing of the industry and its problems. Go within the industry and you are likely to hear cries of "the old gang again". The critics cannot have it both ways. To suggest that denationalization is contemplated is nonsense. Some measure of decentralization may be contemplated, but that is a matter for the future, and it is unlikely to be hastened or delayed by any one appointment.

The important thing was to get the succession settled before Sir James Bowman's great services were lost to the industry. Mr. Robens is an able man and the industry is fortunate to have the promise of his services. It remains for the Minister to complete his appointments to the National Coal Board without further delay. It is believed that the appointment of a second deputy chairman is contemplated, and, if that is so, the sooner the appointment is made the better, so that the members of the board may settle down quietly to work as a team in directing the fortunes of this great industry. The appointment of a new marketing member of the board, about which there had been a great deal of conjecture in the coal industry and trade, has now been made, after a considerable delay. While appointments to the board are of great public interest, as reflecting the important part coal plays in the affairs of the nation, they are of most interest to those who work in the industry. A wise administration removes rumour and conjecture as quickly as possible. Coal industry employees are as human as the rest of us and when a change is contemplated we all like to know who the boss is going to be.

Passing Thoughts . . .

ONE tenth of the money frittered away since 1948 in chasing the tail of the guided missile would, if intelligently spent in Commonwealth markets alone, have ensured our export markets for a generation.—BRIG. G. V. PALMER, chairman of the Council of the Institute of Export.

"We have just got to dam' well sell 200,000,000 *tons of coal" may not be the most elegant memo ever composed by a future chairman of directors. But it gives the coal industry adequate notice of what its new boss expects.—Glasgow Herald.*

It appears that in the National Union of Mineworkers there are persons of some authority who believe that Mr. Robens is being used as a pawn in a sinister Government game designed to make palatable a return to the pre-war policy of district arrangements. It is time these people grew up.—Birmingham Post.

Mr. Robens can feel that he is taking on one of the most difficult and important jobs in the country.—The Scotsman.

The outcry against Mr. Robens from the miners and the Labour party's left wing is extraordinarily shortsighted. If, as the miners fear, the Government plans to make drastic changes in the coal industry, it is surely in their interests to have as chairman a man who has always supported nationalization and who has moreover a trade union background.—Financial Times.

To object to Mr. Robens's appointment, as the miners' spokesmen have done, on the grounds that he is likely to destroy nationalization is just silly.—Daily Telegraph.

The extent to which the Coal Board is made to concentrate on producing coal where costs are low will be the most searching test of the Government's determination to avoid expediency as their guide in fuel policy.—The Times.

There is still plenty of high grade coal in Britain and plenty of high grade miners, but unless more advanced techniques are adopted, our coal industry will be quite dead when the Chinese start developing their 40*-ft. seams.—Letter in the Western Mail.*

If employers and unions want good apprentices they can have them for the asking. They must not be allowed to add to their feeble excuses for inaction the absurd contention that there is a shortage of eligible boys.—MR. ALEC RODGER, Birkbeck College, University of London, in a letter to The Times.

The new rich, the £12 *to* £15 *a week artisans, the motor fitters, the men from Coventry, the men who drive fish lorries, are beginning to recognize, as the miners did many years ago, that income tax is fairly important to them.*—MR. W. R. REES-DAVIES, *Conservative MP for the Isle of Thanet.*

You sometimes hear the theory expressed that the modern industrial worker is not interested in what he does, but is only interested in his pay-packet; and that the coming of automation, by introducing thousands of soul destroying and deadening jobs, is going to make things worse still. I for one believe that theory is as dead as the "coals in the bath" theory.—MR. P. D. O'BRIEN, chairman of Laporte Industries, Limited.

Only when coal sells again because it is cheap and convenient, not because consumers cannot get anything else, will employment in the industry be really secure.—Daily Telegraph.

Britain Invited to ECSC Reconversion Conference

BRITISH representatives are to be invited to take part in a conference on industrial reconversion to be organized by the High Authority of the European Coal and Steel Community in Luxembourg at the end of September. The aim of the five-day conference, which will be attended by delegations from the six member countries and representatives of the Common Market, the European Investment Bank, and the OEEC, will be to examine problems arising out of schemes for industrial reconversion in areas affected by mine closures.

The Community's council of ministers, at its session in Luxembourg last Friday, accepted the revised text of the tariff nomenclature which is to be adopted by ESCC on July 1. It also approved the draft text of an agreement between the Community and Austria relating to the application of through international transport rates for Community products.

The High Authority has also restarted talks with ATIC, France's coal import syndicate, on the question of whether the State-run body is compatible with the ECSC Charter. Also under review is the future of the Belgian coal industry's reorganization, which has been subject to postponement and discussion by the Belgian Government.

After consultations with members of the European Parliament the High Authority has decided to maintain its levy at a rate of 0.35 per cent. for a further year. It is expected that this will realize $31,500,000 in the coming year.

Aluminium Expansion in Uruguay

NEW 1,500-ton extrusion press is to be installed immediately at the Montevideo works of Aluminio del Uruguay, SA, a subsidiary of Aluminium, Limited. This is the first stage of a substantial expansion programme for the fabrication facilities of the Uruguayan company to meet the developing demand for aluminium products. Early next year a 1,800-ton capacity rolling mill is to be installed.

At present Aluminio del Uruguay—one of the country's leading enterprises—produces 2,000 tons of aluminium sheet, foil, and extrusions a year. The new expansion programme will almost double this capacity. Aluminium, Limited, owns 70 per cent. of the capital of the Uruguayan company, the rest being held by local investors.

£11,000,000 BTC ORDER FOR DIESEL LOCO EQUIPMENT

ORDERS valued at £11,000,000 for diesel locomotive equipment have been placed by the British Transport Commission with five British manufacturers—Associated Electrical Industries, Limited, Bristol Siddeley Engines, Limited, the Brush Electrical Engineering Company, Limited, the North British Locomotive Company, Limited, and J. Stone & Company (Deptford), Limited.

The equipment comprises diesel engines and transmissions for 170 main-line locomotives which are being built in British Railways' workshops.

FIRST ESSENTIALS FOR COAL

Mr. Robens Discusses His Appointment

"WE have just got to damn well sell 200,000,000 tons of coal. It can be done and it must be done." After answering dozens of questions on his appointment as chairman of the National Coal Board, Mr. Alfred Robens at a Press conference summed up his task in the words quoted. Acknowledging that there were bound to be some changes in the structure of the industry as its requirements had altered considerably, Mr. Robens stressed that after 20 years of a seller's market, Britain now had to sell its coal and sell it against fierce competition.

If there were any changes to be made they could only be made after he had had plenty of opportunity to see what they should be. Any changes he favoured would be for the sole purpose of improving the efficiency of the industry, bearing in mind its social consequences and the fact that many hundreds of thousands of people were dependent on it.

Asked if he had any specific assurances on decentralization—the miners' chief worry—Mr. Robens said he was not against devolving authority from the centre to the perimeter. He favoured getting the command as near as possible to the point of production so that the workers would know where to go for final decisions.

No Retrogression

The miners also feared a reversion to the pre-war position of district prices and wages. "At this stage I could not change my mind about social responsibilities or consider returning to the pre-war position in the industry," Mr. Robens said.

He realized that the industry was going to face a very difficult time in the next few years, but he was optimistic about its future and thought that its prospects generally were first-class. The British coal-mining industry, operating on the basis of something like 200,000,000 tons a year would be all right, and that left plenty of scope for nuclear power and oil to fit in.

It was a first essential to sell the coal produced and the industry would need a free hand to meet competitors. He was not afraid of that; he would not be content while oil was burnt in any power station in Britain, unless it was next door to a refinery.

Mr. Robens said he had always been disturbed when pits had closed, but the process of pits being exhausted naturally was a continuing one and he was not so much upset by the direct redundancy—for most workers were offered alternative employment—but that no jobs would be ready for miners' sons in the area unless new industries were introduced in time. He saw it clearly as part of his responsibility to bring to the attention of the Government the needs in declining mining areas for new industry.

"I have been associated politically with the mining industry since 1947. I have done as much to study it as anybody else. I have a mining constituency. I realize the mining industry is going to face a very difficult time in the next few years. If within the few years I have in the term of this appointment I can bring the industry through these difficult years and put it on a good, sound, and prosperous footing, I think I shall have made a contribution," he declared.

New Marketing Member for Coal Board

DIRECTOR-GENERAL of marketing of the National Coal Board since July, 1958, Mr. Frank Wilkinson has been appointed by the Minister of Power to be marketing member of the board in succession to Mr. R. H. E. Thomas. When his appointment expired last February, Mr. Thomas informed the Minister that he did not wish to be reappointed. He agreed, however, to continue for a short period and now retires on Thursday.

Mr. F. WILKINSON

Throughout the whole of Mr. Wilkinson's business career, which started in the sales office of Bridgewater Collieries in 1915, he has been connected with the marketing of coal. When the company amalgamated into Manchester Collieries, Limited, Mr. Wilkinson held various appointments on the organization's sales side. During the last war he was seconded for duties concerned with the distribution and programming of industrial coal supplies in the north-west.

A further period of secondment took him to the North German Coal Control as controller of the distribution branch, his duties covering all branches of marketing and distribution of the hard and brown coal produced in western Germany. In 1947 he returned to the UK at the request of the Coal Board as executive officer and secretary of the North West Emergency Committee in charge of coal supplies programming. He went back to Germany in 1949 to take up the post of British member of the distribution branch of the Combined Coal Control Group and was appointed British chairman of the group less than a year later.

When the group closed down at the beginning of 1953, Mr. Wilkinson was appointed manager of the NCB's Liverpool Shipping Office and 18 months later he became senior regional sales officer in the board's North-Western Sales Region. He came to London as manager of the NCB's London and Southern Region Sales Office in 1955.

Obituary

MR. ROBERT NELSON

THE death took place on Thursday of last week of Mr. Robert Nelson, first electrical Inspector of Mines under Sir Richard Redmayne with whom he worked at the Coal Control in the first world war. He was a colleague and lifelong friend of Mr. William McLellan and as one of the first engineers on the staff of Mertz & McLellan, Limited, consulting engineers, was responsible in the early years of the century for the detailed design of the pioneer Carville power station at Wallsend-on-Tyne.

After the first world war he rejoined his old company and in 1927 became a partner with Mr. McLellan in McLellan & Partners, Limited, which took over Mertz & McClellan's industrial practice. He retired in 1939 but retained an active interest in electrical engineering matters.

Mr. GEORGE ASHURST LIPTROT, manager of Colliery Explosives Company, Limited, Wigan, has died at the age of 47.

Mr. H. R. DAVIES, who recently retired as manager of Glyncastle Colliery, Resolven, Neath, has died. He was a trustee of Resolven Miners' Welfare Scheme.

The death occurred on Saturday of Mr. WILLIAM D. MCNAUGHTON, former manager of Gateside Colliery, Sanquhar (Ayrshire). He was 81. Mr. McNaughton retired in 1949.

The death has occurred at the age of 69 of Mr. JOHN HENRY MAXFIELD. Until his retirement a year ago he worked at Ifton Colliery (Denbigh) where he helped to sink the first shaft 30 years ago.

The death has occurred of Mr. WILLIAM STANCLIFFE ASQUITH, a son of the founder of William Asquith, Limited, a member of the Asquith Machine Tool Corporation, Limited, Halifax. He was 60 and retired from the board five years ago.

Former manager of one of the bar mills of the Tinsley Rolling Mills Company, Limited, Sheffield, Mr. ARTHUR EDWARD PINCHES, has died at the age of 76. He was promoted from foreman roll-turner to manager in 1920 and held the position until his retirement in 1947.

Former chairman and managing director of Hartley & Sugden, Limited, boilermakers, of Halifax, Mr. SAMUEL FOX, has died. He was 90. Mr. Fox joined the company in 1886, became a director in 1907, managing director in 1916, and chairman in 1935. He retired in 1946. He was a past president of the Welded Boilermakers' Association, the Institution of Heating and Ventilating Engineers, the Halifax Engineering Employers' Federation, and the Halifax Chamber of Commerce.

Superintendent of the winding department at the Witton works of the Engineering Group of the General Electric Company, Limited, Mr. F. C. ARCHER, died recently at the age of 62. He joined the company in 1937 as assistant superintendent and nine years later was promoted to superintendent. Mr. Archer played an important part in the application of direct-cooled windings for large alternator rotors and stators and, in the field of traction, acted jointly with the late Mr. G. H. Fletcher in producing the Fletcher-Archer armature coil.

The death took place last Friday of Dr. OSWALD JOHN SILBERRAD, in his time one of the country's leading authorities on explosives and research scientist into the erosion of metals. He was 82. In 1908 he investigated the cause of a form of erosion in ships' propellers and developed a bronze alloy to overcome the problem. Later, working in conjunction with the Hotchkiss Company, Limited, he contributed much towards the development of erosion-resisting gun steel. He did much important work on explosives, particularly on the bulk manufacture of lyddite during the first world war.

Five-year Forecast on UK Steel Output

UNITED Kingdom steel capacity is expected to increase from 25,500,000 tons this year to 29,000,000 tons in 1962 and a production of at least 32,000,000 tons in 1965 appears possible. The forecast is given in the Iron and Steel Board's report for 1959 published yesterday (Thursday).

Production in 1959 rose from about 75 per cent. capacity in the first quarter to about 95 per cent. by the end of the year, says the report. Three schemes for increasing sheet making capacity have been approved. These are expected to result in a surplus over likely demand by 1962, which will be available for contingencies or further export. Considerably more home ore is expected to be used in the 1960s.

Investment in 1960 will be substantially higher than in the two previous years. Capital cost of proposals submittted to the Board in 1960 is estimated at £200,000,000, of which two strip mill schemes account for £140,000,000. New steelmaking techniques should lead to a saving in capital costs per ton of capacity, says the report, which adds that quality for quality prices in the UK compare favourably with those in other steel producing countries.

A more detailed summary of the report will be published in next week's issue of Iron and Coal.

IPE Officers for 1961

PRESIDENT of the Institution of Production Engineers, Mr. G. R. Pryor, has been elected to serve for a second year. He is chairman and managing director of the family firm of Edward Pryor & Son, Limited, steel marking device engineers, of Sheffield, and a vice-chairman of the Council of the Production Engineering Research Association of Great Britain. Vice-president for 1960-61 is Mr. Harold Burke, group joint managing director of The Concentric Manufacturing Company, Limited, of Birmingham.

Chairman of the council is Mr. R. H. S. Turner, director and works manager of Associated Electrical Industries (Manchester), Limited. A member of the Institution since 1936, he is also a member of the Institute of Directors. Mr. A. L. Stuchberry, chief technical engineer of the Metal Box Company, Limited, and a member since 1924, is vice-chairman.

VERTICAL continuous casting plant built by Schloemann, AG, Düsseldorf, in conjunction with Concast, AG, Zurich, was recently put into operation at the Industrias del Besos S.A., Barcelona. It is designed for the production of carbon steel billets, and the ladle has a capacity of 15 tons.

Brake on Nuclear Power

5,000,000 TONS MORE COAL WILL BE NEEDED

ANNOUNCING Government plans to cut spending on nuclear power stations by £90,000,000 in the next seven years, Mr. Richard Wood, Minister of Power, at a Press conference on Monday said: "More power stations of the conventional type will be needed, and by the late 1960s there will be a demand for about 5,000,000 tons more coal a year than if we had kept to the 1957 nuclear power programme." Because coal had become more plentiful and oil prospects had improved, the need on fuel supply grounds for accelerating the nuclear power programme had passed, he said.

Referring to the White Paper, "The Nuclear Power Programme," presented to Parliament on Monday, the Minister added that by 1975 power stations would be consuming the equivalent of some 125,000,000 tons of coal a year—well over double the present rate—and by the 1980s their annual requirements could well reach the equivalent of 200,000,000 tons of coal. There were no plans at present to increase the use of oil in power stations.

"The higher the demand by the electricity generating industry for coal stocks, the more beneficial will be the effect on the coal industry, and the less likelihood of it having to stock coal in the future," he said.

Coal Stations More Efficient

The White Paper explains that in 1957 the plan was for enough atomic stations to be built by 1966 to yield 6,000,000 kW. Now the plan is that by 1968 there will be only 5,000,000 kW of nuclear power.

Another reason for the reduced programme was the extent of the falling cost of producing electrical power from the new conventional stations. The development of larger generating sets had reduced the capital cost of these new stations and the use of higher steam pressures had increased their efficiency. Siting of new stations near to low-priced coal sources had also had an advantageous effect.

After allowing for more conventional stations, it was estimated that this rate of ordering would reduce by some £90,000,000 the cost of power stations to be commissioned during the next seven years.

The national interest would best be served by continuing for the time being to place orders for nuclear stations at the rate of about one every year. At this rate there should be at any time five or six stations in various stages of development. Because the capacity of individual stations was likely to increase, this decision should produce a steadily rising rate of nuclear commissioning which should give the country about 5,000,000 kV of capacity in 1968.

"Despite the present world surplus of coal and oil, we still face the eventual prospect that our growing energy demands will call for more and more supplies of nuclear power. In about 10 years' time it should be cheaper to generate base load in nuclear stations than in conventional stations, provided that we achieve the technological progress that is expected. To secure this we must continue to build nuclear stations on an adequate scale."

In the Commons, the Minister suggested that it would be more convenient to discuss the White Paper at another time. He emphasized that the revised programme was not a cut-back but a deferment of the acceleration of the 1957 programme. He gave an assurance that the Government was not abandoning the principle of using the cheapest, most economic, and most efficient sources of fuel. The sole reason for the change was because the point at which nuclear power generation broke even with conventional power generation was going to be further in the future than was at first expected, he said.

Durham MPs Hear of Coalfield's Prospects

CHAIRMAN of the Durham Divisional Coal Board, Dr. William Reid, outlined the division's difficulties, developments, and prospects, to a party of Durham MPs on Friday of last week when they visited the new combined Hawthorn mine and by-products plant. The mine is highly mechanized and Dr. Reid reported that 32 per cent. of the coal output in Durham was now power-loaded compared with 20 per cent. in 1958.

A "real push" was being made to sell coal in competition with other fuels. Advisory and display centres were to be opened at Newcastle-upon-Tyne, Sunderland, and Darlington to back the sales drive.

Looking to the future, Dr. Reid said that the coal boring tower off the coast at Tynemouth had shown five positive results. It had indicated considerable coal reserves which would provide continuous employment for coastal collieries for many years. In west Durham experiments in the working of thin seams were taking place.

Mr. N. F. Nattrass, industrial relations officer, told the MPs that 16,000 miners had been involved in transfer schemes with little or no fuss. Despite the many changes, unemployment among Durham miners was less than 1 per cent. of the total labour force.

World Standard for Safety Headwear

EFFORT is being made to get world standards adopted for safety headwear worn by industrial and mining workers. A new committee of the International Standards Organization has been set up for the purpose on the initiative of the British Standards Institution, the Protective Headwear Manufacturers' Association, and other safety interests.

It will be attended by helmet makers, safety organizations, and Government representatives and other experts from many parts of the world.

In Parliament

NO HELP FOR SHALE OIL

ANOTHER effort to get relief for the shale oil industry of the Lothians was made by MR. JOHN TAYLOR (Lab.) when he moved an amendment to the Finance Bill seeking to exempt Scottish shale oil from excise duty. The first fuel oil ever produced came from West Lothian he said, and the very first oil to reach the US was transported from West Lothian about 150 years ago.

For a number of reasons the shale oil industry had been completely unable to make a trading profit on its main product and had only been able to survive because of small profits on by-products. He questioned the argument that if they imposed a strangling, and in this case a swingeing, tax on an industry they were not really killing but helping it by subsidizing it because the other fellow had to pay a still heavier tax.

At the height of its prosperity the industry employed over 9,000; five years ago it employed 5,000. Today there were less than 2,500—entirely due to the excise duty. His amendment would save the industry from extinction.

MR. ANTHONY BARBER, Economic Secretary to the Treasury, replying, said the industry was not languishing because of the burden of taxation but because it simply was not competitive. In addition to several objections to the clause the Government's decision to adhere to the European Free Trade Association raised an insurmountable difficulty.

NEW NCB CHAIRMAN

ASKED by MR. A. ROBERTS (Lab.) what consultation he had had with the National Union of Mineworkers before appointing Mr. Alfred Robens to succeed Sir James Bowman as chairman of the National Coal Board, MR. RICHARD WOOD, Minister of Power, replied that he had had none.

He added: "The acting president of the NUM has himself said that the union has never been consulted about the appointment of the chairman, and that it did not question the right of the Government to appoint a successor to Sir James Bowman without consultation. I therefore felt that I had discussed the possibility of Mr. Robens' appointment adequately enough with others in the industry who would be fully in possession of the views likely to be held by the NUM."

Mr. Roberts said that most members really appreciated the appointment of Mr. Robens and wished him success and distinction in carrying it out, but he thought that the NUM ought to have been consulted about an appointment of such magnitude, not with a view to accepting its opinion, but to give an assurance of full co-operation.

"NATIONAL COAL STRIKE" WARNING

ANY decentralization of the coal industry with the resumption of district agreements could result in a national coal stoppage, warned MR. ROY MASON (Lab.), when the Minister of Power, MR. RICHARD WOOD, was questioned about his plans for reorganizing the industry. The MINISTER said he was anxious to ensure that its organization was suited to its needs, and he hoped to have the advice of the new chairman of the National Coal Board, Mr. Alfred Robens, on this in due course.

Asking the Minister to say whether he had any plans to decentralize the industry, Mr. E. A. FITCH (Lab.) commented: "These proposals will meet with the most bitter opposition of the mineworkers." The Minister replied that he had at present no plans to put before the House, and the only reason for which changes might be made would be to secure the maximum efficiency of the industry.

Warned by Mr. Mason that if a break-up of the industry took place, or was even mooted by the Minister, the National Union of Mineworkers would undoubtedly be responsible for a national coal stoppage, the Minister promised he would give great weight to the points mentioned, but advised that MPs would be wise to await the plan before coming to a judgment on it.

Durgapur Billet Mill in Operation

FOLLOWING successful preliminary hot-rolling trials on the continuous billet and sleeper bar mill at the Durgapur steelworks in West Bengal, India, the mill is now in production. It is capable of producing a range of billets from 2 in. to 5 in. square, shaped sleeper bar ½ in. by 13¼ in., and slabs required for certain merchant mill sections. These products will be used as stock for the continuous merchant mill and the sleeper plant of the steelworks or will be available as billets for sale to the re-rolling and forging industries.

The capacity of the mill averages an initial output of at least 12,000 tons for a six-day week operating on a two-shift basis. This high production unit, utilizing the latest mechanical aids, is capable of sustained output with very little demand on skilled manpower. The billet mill has been built to Morgan design by the Davy & United Engineering Company, Limited, a member company of ISCON, the British consortium constructing the works at Durgapur.

Engineers Revive Three-week Holiday Claim

LAST year's rejected demand for three weeks' annual holiday paid for at average earnings instead of basic rates is to be put forward again by the shipbuilding and engineering unions. A resolution to this effect, seeking a minimum of £2 10s. a day holiday pay, was passed at the annual conference of the confederation at Llandudno on Wednesday.

"The" resolution of the Conference came yesterday (Thursday) when it was decided to submit an immediate application for a general pay rise for the unions' 3,000,000 members—a rise which on current production figures was "morally just and economically sound," said AEU president, Mr. W. Carron.

Dutch Combine Studies Steel Expansion

ROYAL Netherlands blast furnaces and steelworks (Kon. Nederlandse Hoogovens und Staalbedryven), the Dutch cable works (Nederlandse Kabelfabrieken), and the State collieries (Nederlandse Staatsmynen) are to co-operate in studying the possibility of establishing a new integrated iron and steel works next to the existing steel plants. The feasibility of expanding the capacity of existing plant has already been considered.

If the study gives positive results plans concerning the site and size of the new plant will then be considered. This enquiry is independent of the plan to establish a new iron and steel works at Rotterdam.

Menace of Oil

COAL BOARD CHAIRMAN'S GRAVE WARNING

CONCERN felt by the National Coal Board and the industry generally at growing amounts of fuel oil being imported from refineries abroad has frequently been voiced not only by miners' leaders but by Sir James Bowman, chairman of the Coal Board. Speaking at the golden jubilee conference of the Association of Mining Electrical and Mechanical Engineers at Blackpool last Friday, Sir James left no doubt in the minds of his audience of the "very serious threat" to the security of the industry if such oil imports were allowed to amount to dumping.

The industry had reached, he said, one of the most critical stages in its history. No prospect could be seen of a return to the conditions of the 10 years after nationalization. The foremost, and most significant, of the long-term factors responsible for the difficulties they had had to face in the last three years was the competition from the oil industry, particularly in the large and vulnerable market for industrial coal.

He was seriously concerned about the large and increasing quantities of fuel oil being imported into this country from refineries abroad. He was not referring to oil produced from home refineries—it was not unreasonable for the oil companies to seek to find markets in this country for those products. The import of surplus fuel oil from oversea refineries was another matter entirely. It was treated as one of the by-products of the refinery process and was imported at a price well below that of the crude oil from which it was produced.

Imports May Grow

Net imports of fuel oil into this country increased by about 5,500,000 tons—equivalent to more than 9,000,000 tons of coal—in 1959, compared with 1953. Over half the additional sales of fuel oil in recent years had come from this source and not from home refineries. So far this year net imports of fuel oil had doubled compared with the same period of last year.

Western Germany, Sir James continued, had recently imposed heavy taxes on all heating oils in order to protect her coal industry. France might well do the same. "The result is bound to be an increase in pressure to import still more surplus fuel oil into this country," he said.

The Coal Board was confident that, given fair conditions, it could achieve the figures given in the Revised Plan for Coal, but if the country were flooded with a continuing increase in imports of fuel oil, sold at very low prices, amounting almost to dumping, against which it would be impossible successfully to compete, the mining industry would face a very serious threat to its future security—"and the effect of that would be something this country would regret," he added.

"I sincerely hope that this position will never arise. For if it does, even with the efficiency of the industry built up to a level far higher than ever before, there would be little, if anything we could do in those circumstances. I believe that a wise and farsighted policy in the national interest would at all costs avoid the folly of such a position," Sir James maintained.

Central Control Plan for Belgian Coal Mines

CENTRALIZED control of the Belgian coal-mining industry, subject to Government veto on important decisions, is planned in a Bill put forward by the Ministry of Economic Affairs. One aim of the Bill is to enable a central body to order colliery closures and amalgamations without undue loss of time.

The Bill will set up a national coal mines committee which will also have powers to co-ordinate investments, dictate production policy and, if necessary, control prices and conditions of sale, and establish investment programmes. It will consist of Government, company, and trade union representatives.

This is the second stage of the Belgian colliery reorganization programme, which is scheduled to reduce output by 1964 by about one third of the capacity of five years ago. The first stage, which called for pit closures covering 5,500,000 tons production, is expected to be completed by June, 1961. Of the 23 pits scheduled for closure, 17 are already closed.

Peak Belgian output of just over 30,000,000 tons was reached in 1953, since when over 5,000,000 tons capacity has been closed. The total raised last year was only 22,750,000 tons.

New Sutcliffe Company, Plant and Equipment Hire Service

FORMATION of a subsidiary company, Sutcliffe Plant Hire, Limited, is announced by Richard Sutcliffe, Limited, manufacturers of mechanical handling equipment, of Horbury (Yorks). Many potential users are deterred from the purchase of new plant, either because it will be required for a limited period or because capital outlay is prevented by other commitments.

The new company is, therefore, offering a hire service ranging from single conveyors to complete installations as well as for equipment such as hydraulic drives and electronic control gear manufactured by other companies within the Sutcliffe group. The new company's offices are at 14a, Bond Street, Wakefield (telephone: Wakefield 6433).

BRAY CONSTRUCTION EQUIPMENT, LIMITED, Feltham (Middx), has appointed William R. Selwood, Limited, Chandler's Ford, near Winchester, sole agents in Hampshire, Wiltshire, Dorset, Somerset, and Berkshire for its hydraulic loading shovels.

Personal

Wallsend County Secondary Technical School is to be officially opened on July 15 by Mr. H. H. MULLENS, chairman of A. Reyrolle & Company, Limited, Hebburn, and of C. A. Parsons & Company, Limited, Newcastle-upon-Tyne.

Mr. JOHN G. A. HECKELS, marketing manager of the No. 2 (Mid-East Durham) Area of the Durham Divisional Coal Board, has been elected NCB representative on the board of the River Wear Commissioners. He succeeds Mr. Thomas Dunn who has retired.

MR. BRIAN H. TURPIN, managing director of Q.V.F., Limited, chemical engineers, Fenton, Stoke-on-Trent, and of Quickfit & Quartz, Limited, laboratory glassware and chemical plant makers, of London, W.1, has been elected to the Council of the British Chemical Plant Manufacturers' Association.

Mr. C. R. WATERHOUSE, chairman of C. R. Waterhouse, Limited, electrical and mechanical engineers, of Sheffield, has been installed as president of the Electrical Contractors' Association. The first Sheffield man to hold the national presidency of the association, he has been secretary of the Sheffield branch for 15 years.

In the Military Division of the Order of the British Empire in the Birthday Honours List, Major KENNETH LEONARD COOMBER WRIGHT, Officer Commanding 915 Company, Royal Army Service Corps (TA), Bristol, who is company secretary of Lowell Baldwin, Limited, coal and coke distributors, of Bristol, and a director of subsidiary companies, was made MBE.

A presentation is to be made tomorrow (Saturday) by the staff of J. B. & S. Lees, Limited, manufacturers of steel strip, of West Bromwich, to Mr. JOHN LEES, who retired last month. Mr. Lees, grandson of the founder of the firm, was its chairman for 43 years until last month when the company joined the Harper Engineering & Electronics, Limited, group.

At a recent meeting of the council of the British Welding Research Association, Mr. J. D. D. MORGAN and Dr. L. M. WYATT were appointed to the Research Board. Mr. Morgan is with the general chemical division of Imperial Chemical Industries, Limited, and is the chairman of the ICI Welding Panel. Dr. Wyatt is the chief metallurgist of the Central Electricity Generating Board.

Leader of the Minnie Pit (Staffs) rescue team in the 1915 and 1918 disasters, Mr. GEORGE E. ROWLEY, and his wife celebrated their diamond wedding anniversary on Saturday. Mr. Rowley, who is 82, started work at the age of 12 at Podmore Hall Footrail Colliery and later became an underground deputy at Minnie Pit. He was also a member of the rescue team at the Hem Heath Colliery disaster in 1915. He retired from mining in 1925.

GKN Acquires Interest in Bynea Holdings, Limited

THIRD interest in the equity of Bynea Holdings, Limited, has been acquired by Guest, Keen & Nettlefolds (South Wales), Limited, the other two thirds being held by John S. Tregoning & Company, Limited, and Ductile Steels, Limited.

Bynea Holdings was formed to re-purchase the Bynea Steel Works, Limited, and its subsidiaries from the Iron & Steel Holdings and Realization Agency in 1957. It was formed by John S. Tregoning—with the majority interest—in conjunction with Ductile Steels and Robert Benson, Lonsdale & Company, Limited.

Two New Institution of Works Managers' Branches

DUE to increasing membership, the Institution of Works Managers is to make a planned division of the London branch of the institution into a number of independent branches. The first two branches approved by the institution's council are the Bucks & Berks branch and the East Surrey & Sussex branch.

The division will reduce the London area to a Central London branch to serve members who live and work in London itself. Six or seven new branches will be created during the next few years. The first chairman of the Bucks & Berks branch is Mr. L. C. Smith, of Harrison & Sons, Limited, printers, of High Wycombe, and the chairman of the East Surrey & Sussex branch is Mr. N. A. W. Stacey, of Stone Chance, Limited, makers of marine and aviation navigational aids, etc., of Crawley. Meetings will take place at convenient centres in the respective areas, such as previous group centres.

The IWM training course is already being held at Slough, and it is intended to start courses at High Wycombe and Crawley in September, in addition to the courses in other parts of the country.

AEI Apprentices on Oversea Project

VOLUNTARY Service Overseas, the organization which sends young people abroad on various projects, has selected two of the 1,000 apprentices at AEI (Rugby), Limited, to spend a year in one of the underdeveloped Commonwealth countries working on voluntary service schemes. They are Christopher Over (19), a craft apprentice and section representative of the company's Apprentices' Association, and Kenneth Hathway (18), an apprentice technician and secretary of the association.

The boys' destination is unknown, but they expect to leave England in a month's time. A spokesman of the company said that it was 100 per cent. behind the scheme. "We would like to send a couple of dozen apprentices," he declared. "Far from being a break in their training, this year abroad is an invaluable part of it. The work these boys will do and the help they will give others will deepen their own experience."

Committee of British Employers Operating Abroad

COMMITTEE of British Employers Operating Abroad, which supplies its member companies with information on labour conditions abroad, has re-elected Mr. Arthur C. Main chairman. He is a director of Associated Electrical Industries (Manchester), Limited, Metropolitan-Vickers-Beyer-Peacock, Limited, and Sunvic Controls, Limited. Mr. R. E. Leapingwell, the vice-chairman and a director of Aiton & Company, Limited, has also been re-elected.

Mr. P. Archer, Simon-Carves, Limited, has been elected treasurer in succession to Mr. Arthur Baker. Mr. D. A. Patterson, J. & E. Hall, Limited, and Mr. E. J. H. Barker have been elected to the executive committee.

THREE FUEL PRIORITIES

"Lunacy if Coal Industry is Run Down"

ADDRESSING 20,000 miners and their families at the annual Yorkshire miners' rally at Rotherham last Saturday, Mr. Harold Wilson, Labour MP for Huyton, and Shadow Chancellor, said: "We believe it is necessary to have an overall fuel plan based on a clear recognition that our own coal industry should not be allowed to decline any further. It would be lunacy to allow the coal industry to run down and make ourselves dependent on imported oil."

Mr. Wilson said the Government's fuel policy should be based on three priorities—indigenous coal, oil products from home refineries, and imported oil. Further, the Government must fix a figure for coal production and then relate its general policy to ensure that demand did not fall below that figure.

The joint committee on fuel policy of the TUC and the Labour Party Executive had now virtually finished its work so far as the immediate fuel problem was concerned, and it was hoped that before the end of June it would report to the two parent bodies, he said.

Call for Fuel Oil Tax

The long-term prospects for coal were not unhopeful, particularly with the gasification of coal, smokeless fuels, railway electrification and an expanding demand for electricity and steel, Mr. Wilson went on. In their six-point programme they wanted opencast coal to be "cut to the bone." Dual-fired electricity generating stations now burning oil should be converted to coal, and fuel oil should again be the subject of tax. A tax of 1½d. to 1¾d. a gallon on fuel oil would yield more than £25,000,000 a year.

Mr. William Paynter, general secretary of the National Union of Mineworkers, spoke of the heavy rate at which the coal industry was being denuded of workers. In the first 20 weeks of this year 40,000 had left, and they were now facing an abnormal rate of wastage of manpower in the region of about 80,000 men a year.

He said he was not satisfied with the declarations that had so far been made about the denationalizing of the industry. There was a definite intention on the part of the Government to introduce structural changes in control and financing. This had not been repudiated by the Minister or any responsible representative of the Government.

"I warn the Government that the know-how and the will to fight are still with us, and will be exercised if there is any intention significantly to interfere with the structure and running of the industry." He added: "We are not afraid of district agreements, but we are afraid of the reintroduction of competition as between one coalfield and another, and we will never allow this to return."

Earlier, Mr. Harold Wilson had referred to the appointment of Mr. Alfred Robens as chairman of the National Coal Board, saying he was confident that he would be "to the forefront in resisting any attacks there might be on the standard of the industry."

Reference to Mr. Robens was also made by Mr. Hugh Gaitskell, Labour Party leader, speaking at Brandon Colliery (Co. Durham) the same day. "Having worked closely with him at the Ministry of Fuel and Power in the Labour Government and in the House of Commons, I believe he has just the qualities that are needed. He has energy, courage, humanity, and shrewdness, and at the same time a remarkable capacity for getting on with all sorts of people and getting the best out of them. He would never allow himself to be the instrument by which reactionary policies are applied."

The appointment is understood to have been sharply criticized at a meeting of the Conservative Backbenchers' Power Committee on Wednesday, at which the Minister of Power was present. The criticisms appear to have had a common theme that Mr. Robens has not had the practical experience of controlling a large-scale industry required at the Coal Board at a critical stage in the coal industry's development and that a man so closely identified with Labour policies and political activity should never have been chosen.

New Colliery for Warwickshire Coalfield

NOW that there is ample evidence of more than sufficient reserves of first-class coal, the decision has been taken to develop a new colliery at Daw Mill, near Over Whiteacre, in the Warwickshire coalfield. The new colliery will produce nearly 600,000 tons of coal a year. Reserves in the famous Thick Coal of Warwickshire are available for at least 70 years at this rate.

The estimated cost of the scheme is about £4,000,000, including the work already carried out, and about 1,400 men will be employed when the new pit reaches full capacity. Most of these men will continue to go underground at Dexter Colliery, but coal will cease to be wound at Dexter when Daw Mill is completed.

Kingsbury and Dexter Collieries are at present linked for ventilation and other purposes. There is, however, only one shaft at Dexter and the coal is taken overland to Kingsbury. The Dexter workings are now well extended and another shaft was necessary to provide ventilation for their further development. A shaft, 610 yds. deep and 20 ft. in diameter, has just been completed at Daw Mill for this purpose and it will shortly be connected by underground roadways to the Dexter workings.

When the new colliery is ready for production, the coal from Dexter workings will be wound at Daw Mill without other underground changes, the men continuing to descend at Dexter. Daw Mill will also exploit a further large reserve of the Thick Coal. A coal preparation plant of the latest design is also a feature of the scheme.

Non-ferrous Metals

Belgian Congo Influence on Tin and Copper

TIN continues to be a firm market in London. The rise in the price has been fairly sharp over the past fortnight and the outlook is still good. The present position is that nearby supplies are scarce and it now appears that there will be no intervention in the market by the buffer stock manager. The position has also been helped by the decline in tin production in Bolivia; a much improved demand from the Continent, particularly from Holland following the cessation of supplies from Indonesia, and from Belgium where buying continues as a hedge against the possible dislocation of supplies at the end of this month when the Congo achieves its independence.

Singapore is also a firm market as is New York where the price is not far short of $1.02 a pound. UK stocks of tin at the end of last week totalled 8,576 tons.

Copper in London continues to be dominated by the Belgian Congo and fears are expressed about the future of Union Minière du Haut Katanga which operates all the Congo's copper mines and accounts for about 7 per cent. of world production. Any dislocation of supplies would seriously affect consumers in Europe. Other than this influence the market in London is dull. Stocks of refined copper in LME warehouses rose last week by 20 tons to 3,383 tons. In the US the market is featureless with the price unchanged for both custom smelters and producers at 33 cents a pound.

Lead continues irregular in London and under the influence of small but persistent selling pressures, prices have tended to ease. In the US the market is fair and the price is still called 12 cents a pound.

Zinc is dull in London mainly on the expectation of further arrivals of foreign metal. In the US the market is featureless with the price unaltered at 13 cents a pound.

Official metal prices in London yesterday (Thursday) were:— Copper, Standard: Prompt £257 10s., forward £248. Tin, Standard: Prompt £797, forward £792. Lead: Prompt £71 15s., forward £72 12s. 6d. Zinc: Prompt £90 2s. 6d., forward £90 5s.

Institute of Marketing Formed

A NEW body, the Institute of Marketing, has been formed by the Incorporated Sales Managers' Association to organize its educational activities, it was announced at the association's annual meeting on Thursday of last week. To prepare students for the institute's diploma examinations a three-year course is to start at Sheffield College of Technology in September.

Mr. Hugh Cameron, sales manager of the United Steel Companies, Limited, has been elected chairman for the golden jubilee year of the association. A conference to celebrate the jubilee is to be held in London in the autumn.

CONVENTION for 50 delegates from oversea agencies is being held by Plessey International, Limited—the export marketing organization of the Plessey Company, Limited. It is the first venture of its kind by the company and is intended to show the agents the expansion in oversea trade achieved by Plessey in recent years.

Ore Chartering

FROM an owner's point of view the immediate outlook is not particularly good, as today markets are quiet and from certain loading areas it would appear that tonnage will be in excess of demand. Freight rates from certain of the major markets are barely steady.

The Mediterranean trades are quiet, Melilla Rif to Continent paid 18s. for a 9,000-tonner, middle July/August 9, on gross terms with the option of Setolazar loading at 18s. 6d., but there is no particular demand for Continental discharge and nothing quoting on the open market from North Africa to the UK. There are one or two miscellaneous enquiries for tonnage to load ore from West Africa but certainly no pressure on the part of charterers. Poti/Birkenhead reports 9,500 tons for June 20 at 37s. 6d. On the other hand there is the seasonal shortage of the handier sizes of tonnage available for ore.

Toulon/Newport bauxite paid 22s. 3d. f.i.o. for a 12,000-tonner middle June with inquiry maintained for late July. Barcelona/Leith reports 3,000 tons potash for July 12 at 35s. f.i.o. Ore from Vitoria to Poland records 51s. 6d. for 9,500 tons June/July and a 14,000 tonner from Rio to Ymuiden or Amsterdam at 45s. for June 22/July 5. There is only a moderate interest on the part of phosphate charterers from Casablanca, but tonnage could be taken for UK discharge.

There is some interest from Huelva with pyrites for both UK and Continental discharging ports. Sulphur has been fixed from Port Sulphur to Cork and Manchester including Ellesmere Port for second half June at 50s. for about 9,000 tons.

Shipyard Apprentices' Wage Claim Adjourned

CLAIM for more pay for 16,000 apprentices and young people by the Confederation of Shipbuilding and Engineering Unions was adjourned on Thursday of last week because of a "misunderstanding" by the employers. The Shipbuilding Employers' Federation offered to increase the percentages on the minimum basic rates, but the union pointed out that this would benefit only a small number of boys because most were working on payment by results and piecework, and many earned above minimum rates. They wanted an all-round increase.

Mr. G. H. R. Towers, the employers' president, said the claim had not been understood on these lines—namely a general increase in wages for all apprentices and boys. The union agreed to an adjournment.

Shipyard labourers at present paid the national time rate of 157s. 6d. on new shipbuilding or 160s. 6d. on ship repairing for a normal working week of 42 hours, are to receive a compensatory payment of 1½d. per hour under an agreement reached on the same day between the Federation and the National Union of General and Municipal Workers and the Transport and General Workers' Union. The increase applies to those not receiving any additional wage payment by results, incentive, or other form of bonus payment.

THE SEA-GOING COAL BORING TOWER at South Shields is to be beached so that certain of the air pipes can be renewed. The tower has been working off Tynemouth for some time and the repairs will take a week to 10 days.

REORGANIZATION OF *Langwith Colliery*

Providing Increased Shaft Capacity

By P. I. ALLSOP, B.Eng.

Dwindling reserves of coal in the High Main Seam were largely responsible for the reconstruction of Langwith Colliery. In this paper, presented to the Midland Branch of the National Association of Colliery Managers on January 12, 1959, the author, who is manager at Langwith Colliery, describes the work entailed in providing additional shaft capacity to cope with the output from the fully mechanized faces in the newly developed Main Bright and Clowne seams.

LANGWITH Colliery is situated approximately 7 miles to the north of Mansfield, and 9 miles to the east of Chesterfield. It is one of the collieries in the No. 1 Area of the East Midlands Division of the National Coal Board. The two 14-ft. dia. shafts were sunk to a depth of 566 yd. for the purpose of working the Top Hard Seam. Sinking, completed in 1878, proved the depth and thickness of the following workable seams:—High Main, 190 yd., 3 ft.; Clowne, 305 yd., 2 ft. 11 in.; Main Bright, 336 yd.,

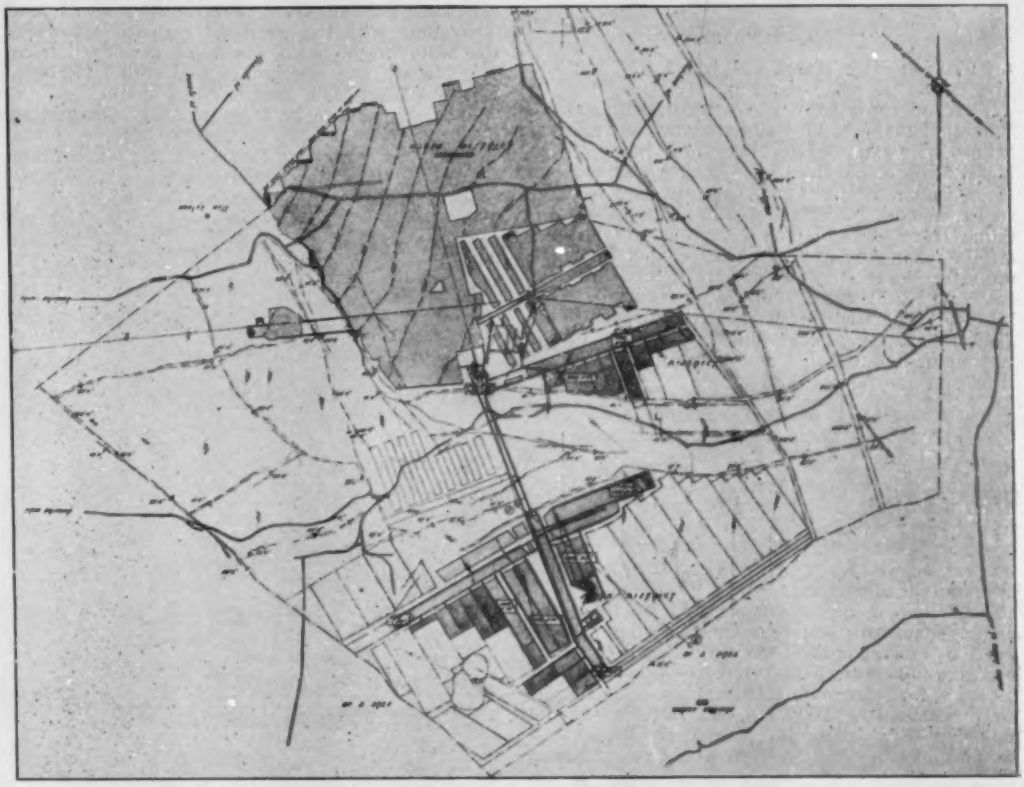


FIG. 1.—PLAN OF HIGH MAIN SEAM WORKINGS.

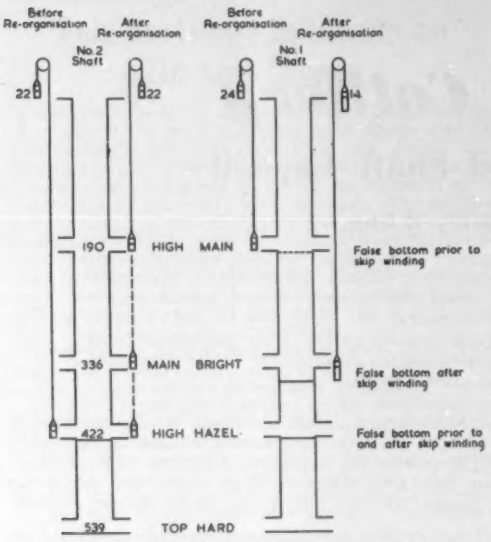


FIG. 2.—WINDING FACILITIES.

4 ft. 10 in.; High Hazel, 423 yd., 3 ft. 8 in.; and Top Hard, 539 yd., 5 ft. 10 in.

The Top Hard Seam was worked most successfully until 1943 when it was abandoned and allowed to become waterlogged. Workings in the High Hazel Seam commenced in 1936, and after the Top Hard Seam was abandoned, false bottoms were installed in both No. 1 and No. 2 shafts at 423 yd. (High Hazel) Level. The seam was worked only on the north side of the shafts; difficult roof conditions and excessive water were experienced and the High Hazel was abandoned as a working seam in 1946. The High Main Seam was opened up in 1943 and, at the present time, 60 per cent. of the pit output is obtained from this seam and sold as industrial and household fuel.

Objects of Reorganization

In 1955, when a reorganization of the colliery was first considered, all the output was being obtained from three widely scattered districts in the High Main Seam (Fig. 1). In two of the districts, coal was transported by trunk conveying systems to a common loading point; in the third district, the coal was carried by trunk conveyors and then loaded at a separate loading point.

Both loading points were served by the same endless main rope haulage. Concentration of output above a certain level was difficult, due to faults, roof and floor water, and ventilation problems. Reserves in the seam were such that the output could be maintained at 2,000 ton/day saleable for the following five years, but thereafter, the output would diminish until the seam would be exhausted by 1962.

Using a false bottom in the No. 1 shaft, High Main Level, mineral was raised in 17-cwt. capacity tubs, two tubs per deck and two decks per cage. The output for maximum efficiency in winding and washing was about 200 ton/hr. run-of-mine coal. Due to these various limitations, the introduction of power loading on the faces appeared to be a somewhat risky proposition.

It was therefore decided that the Main Bright and Clowne seams should be developed to replace the High Main, and while this was being done, it was also decided to provide adequate winding and washery facilities suitable for dealing with output from fully mechanized faces in the new seams. The newly installed plant was designed to increase the existing daily output of 2,000 tons by a further 1,000 ton/day saleable, making a total of 3,000 tons.

In order to achieve the increase in output from a greater depth, it was first necessary to provide increased winding facilities at No. 1 shaft, as at no time was it envisaged that No. 2 shaft should be used for winding anything but men, material, and a small amount of development mineral.

The small diameter of No. 1 shaft weighed against a mine-car installation and skipwinding appeared to solve the problem of winding capacity. It was calculated that two 7-ton capacity skips would deal adequately with the projected output, and while the Main Bright Seam was being developed from No. 2 shaft, one skip would deal with 2,000 tons from the High Main inset in No. 1 shaft.

Each skip was to be provided with a manriding deck capable of carrying only 14 men, but this reduction in manriding capacity to the High Main Level was overcome by replacing the existing parallel drum of No. 2 winding engine with a clutch-drum winder so that double-cage winding could be carried out at all levels in No. 2 shaft (Fig. 2).

Summary of Work Done.—The work done towards the reorganization includes:—(1) Installation of the clutch drum in No. 2 winding engine;

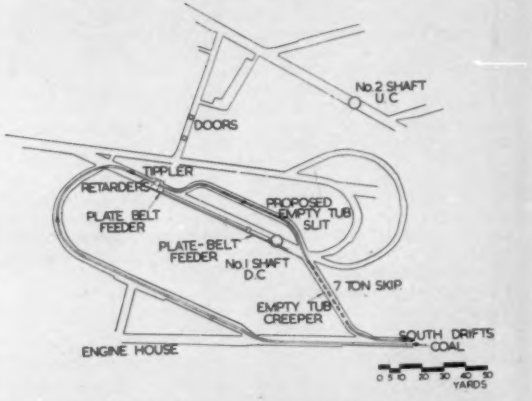


FIG. 3.—PLAN OF OLD AND NEW PIT BOTTOMS IN THE HIGH MAIN SEAM.

(2) modification to the No. 1 Pit bottom, High Main Level, to accommodate skipwinding; (3) alterations to the surface, to accommodate skipwinding; (4) installation of skips; (5) development of the Main Bright Seam and installation of power loaders at the face; (6) provision of skipwinding from the Main Bright Level; (7) provision of underground surge capacity in the form of a twin-spiral bunker; and (8) partial alteration to the surface dirt disposal scheme.

Major Items to be Completed.—To complete the project, the major items of work outstanding are as follow:—(1) Completion of surface dirt disposal scheme; (2) elimination of electrical generating plant; (3) electrification of winders; (4) modification to the No. 2 shaft airlock; (5) provision of new screens and washery; (6) development of the Clowne Seam.

In a reorganization of such magnitude, it is impossible to compress into a short paper full details of the work entailed. It is therefore proposed to outline what has been accomplished and, as the project is by no means completed, an attempt is made to elaborate on some of the more interesting facets of the work already done.

Phase 1—December, 1955, to Holiday Period, 1956

The No. 1 High Main inset and pit bottom were modified structurally, as shown in Fig. 3, to accommodate skipwinding, and excavation made

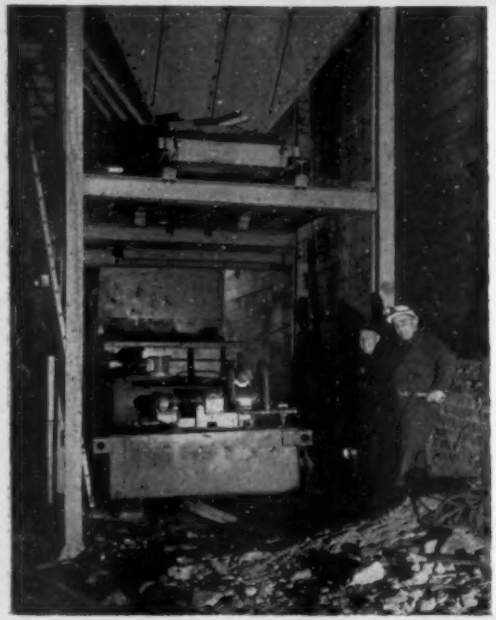


FIG. 4.—SMALL HOPPER, SHORT CONVEYOR, AND RECEIVING END OF SKIP FEEDER IN HIGH MAIN SEAM.

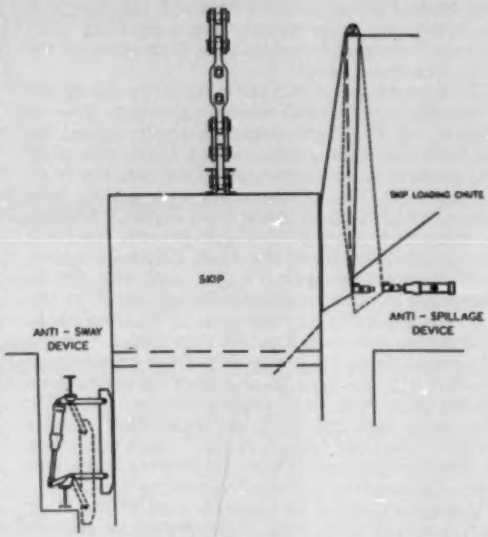


FIG. 5.—SKETCH SHOWING SKIP-HOLDING DEVICES IN HIGH MAIN INSET.

for a tippler at which the existing tubs would be tipped. A shaft runround was made to conduct the empties from the tippler to the empty side of the shaft where they would rejoin the old circuit. At the full side of the pit bottom, height and width were made to accommodate the later installation of the equipment which would take the coal from the tippler to the shaft side.

A roadway of limited size was driven to connect No. 2 to No. 1 shaft in the Main Bright Seam. At the latter shaft, spear guides were installed, and below the seam level, bumping baulks, balance-rope box, catch scaffold, etc., were erected.

Work was done on the surface to alter the shaft eye and to provide room at the shaft side for the discharge of the skips into a hopper and to provide access for plate conveyors to transport mineral from the shaft-side hopper to the screens. As the skips would have different shapes from the cages, the conductors would need shifting, and work on the headgear proceeded to this end. Due to the shape and height of the skips, the centre of gravity of the suspended load was altered and provision had to be made for the eventual lateral shifting and lifting of the pulley wheels. In addition, changes were made on the screens to incorporate part of the proposed new dirt disposal scheme.

Phase 2—Holiday Period 1956

During the first holiday week of 1956, the parallel drum of No. 2 winding engine was replaced by two 14-ft. dia. drums, one a fixed drum and one a clutch drum, manufactured by Markham & Company, Limited, Chesterfield. During the second holiday week of 1956, the creeper to the top deck and retarders to the bottom deck on the full side of the

High Main Pit bottom were removed, together with the empty-side drop hoist. The supporting side-walls and the top deck floors on both sides of the shaft were demolished.

The equipment to take the coal from the tippler to the shaft side was installed, giving a flow as follows:—A Plowright single tub tippler tipped the coal from the existing tubs on to a 36-in. wide plate belt, made at Area workshops. Coal was fed from this to a 42-in. Sutcliffe conveyor with gravity loop take-up, which in turn fed a 7-ton capacity hopper, the object of this hopper being to prevent continual stopping and starting of the 42-in. conveyor motor. From the small hopper (Fig. 4), coal was fed to another 36-in. wide plate-belt feeder, made at the Area Workshops, and finally, to a variable speed hydraulically-operated Sutcliffe skip feeder.

At the surface, the headgear pulleys were moved into their new positions, as also were the conductors. The old spear guides and cages were removed. The skips were installed and the new spear guides erected. The false bottom at No. 1 shaft was taken out, longer ropes were put on the winding drum, and finally the balance rope was fastened to the skips.

As winding would be from an inset at the High Main Level, devices were incorporated to prevent swinging of the skip in the shaft while being loaded. These took the form of an anti-sway device and an anti-spillage retractable chute illustrated in Fig. 5. The operation of these is as follows:—

When the skip arrives at the High Main inset, the beam of a photo-electric cell is broken to cause a relay to be energized, and so operate a thruster which unlocks the valve-operating lever. The onsetter is then able to open the hydraulic valve to bring the anti-sway device into loading position through a 2½-in. bore, 12-in. stroke hydraulic jack.

FIG. 6.—DELIVERY OF 42-IN. TURNER PLATE CONVEYOR AND 48-IN. BELT CONVEYOR ON THE SURFACE.

When the anti-sway device is in position, a pilot valve is operated automatically which allows oil pressure to operate the retractable chute through a 2½-in bore, 15-in. stroke hydraulic jack. Immediately the anti-sway device moves into the shaft, a limit switch is operated which lights a sign in the winding engine house, indicating to the winding engineman that the mechanism is working and that the shaft is obstructed.

The skips, which are 24 ft. 8½ in. high, 8 ft. 6 in. wide, and 3 ft. 7 in. deep, were manufactured at Area Workshops. They were originally fitted with anti-breakage devices in the form of Dunlop struts and anti-breakage doors. However, these struts never worked satisfactorily, and while experiments with this equipment have been carried out, a successful arrangement has not yet been found.

To convey the mineral from the shaft side to the screens, a hopper, a Plowright variable-speed plate conveyor and a 42-in. wide Turner plate conveyor were installed. At the delivery of the Turner plate conveyor, a traversing chute operated by compressed air was arranged so that coal could be sent to the screens via a 48-in. Turner belt conveyor (Fig. 6), and rock to join the washery discard via a 42-in. Turner plate conveyor.

To effect a temporary improvement in dirt disposal arrangements, two scraper conveyors and three 30-in. belt conveyors were erected. The initial surface improvements were completed with the building of a banksman's control cabin.

Phase 3—Between Holiday Periods of 1956 and 1958

Heading out in the Main Bright Seam was continued rapidly using arc-wall shearers and Joy loaders, and setting arched roadway supports, but due to an unexpected serious deterioration in the High Main face conditions, development had to be intensified to provide two production units by February, 1958. AB Meco-Moore power loaders were installed on both faces and to date have given excellent and consistent results.

The output from these faces together with the development coal and rock was wound at No. 2 shaft until July, 1958. In the Main Bright Seam it was the ultimate intention that mineral transport should be by means of conveyors, and to provide surge capacity underground it was decided to make a bunker and install spiral chutes, indicated in Fig. 7, so that 400 tons of coal and 400 tons of dirt could be stored in adjacent compartments. In view of the fact that both the Clowne and the Main Bright seams could be worked together, and there is approximately 31 yd. between them, it was arranged for the top of the bunker to be in the Clowne Seam and the bottom of the bunker to be in the Main Bright Seam.

A drift was taken from the Main Bright Seam at a gradient of 1 in 5.5 to meet the Clowne Seam about 40 yd. from the shaft, and a 45-yd. heading driven in the Clowne Seam to the position of the bunker top. The spiral bunker was designed to be pear-shaped in section, 30 ft. long on the major axis, the circular ends being 5 ft. and 10 ft. 6 in. radii.

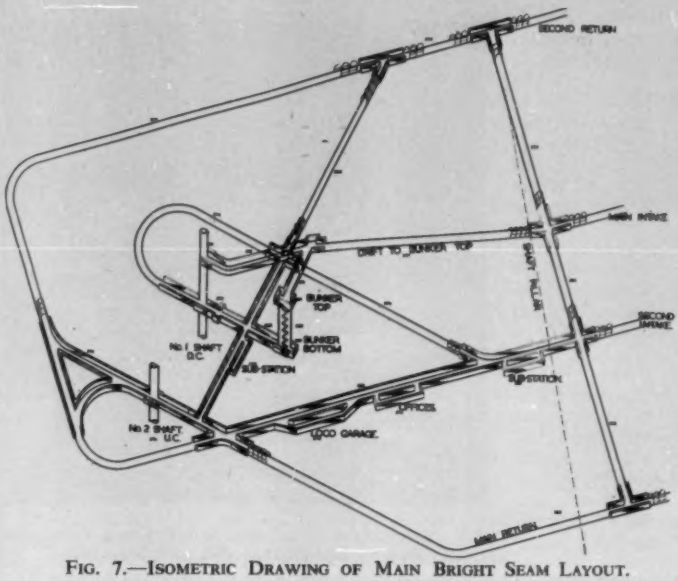


FIG. 7.—ISOMETRIC DRAWING OF MAIN BRIGHT SEAM LAYOUT.

In depth, the bunker is approximately 78 ft., with a chamber at the top, 22 ft. high, and a chamber at the bottom, 20 ft. 6 in. high.

The two spiral chutes are identical, each being 6 ft. dia., 9 ft. pitch, with the dividing wall so spaced to give twice the volume on the coal side as on the rock side. There is an inspection chamber near the midway mark, with access into both the coal and dirt spirals. This chamber is 7 ft. 6 in. high, 4 ft. deep, and 15 ft. 6 in. long. Access to the inspection chamber is provided by vertical columns of 3-ft. internal diameter cast concrete tubes.

In planning the bunker excavation, the following factors had to be considered:—(1) To sink downhill and lift the debris by the conventional method would entail winding the debris out of the pit via No. 2 shaft. This shaft, however, was almost completely occupied by turning the output of two Meco-Moores, plus coal and stone produced in three headings, each of which was advancing 25 to 30 yd./week. In addition, No. 2 shaft was the main man-riding shaft for the High Main Seam and all materials for both seams had to be handled there. (2) There was at least half a shift available per 24 hr. for rock turning at No. 1 shaft. (3) Direct access could be made from the bottom of the bunker to No. 1 shaft for dirt handling.

It thus appeared that No. 1 shaft was better fitted for handling the debris from the bunker, and the choice then lay between sinking upwards, with the conventional difficulties of lifting supports, etc., into place, or to bore a large diameter hole, the depth of the shaft, and sink downwards, throwing the dirt down the hole to the bunker bottom and removing the dirt directly to No. 1 shaft. It was decided to take the latter course of action, although ultimately, a limited amount of sinking upwards had to be done.

Thus, the roadway to the bunker bottom was driven to a height of some 10 ft. A 30-in. conveyor was installed from the bunker bottom, to deliver into a temporary hopper capable of holding 7 tons of rock. From the hopper, rock was fed on to a 16-ft. 6-in. long, 3-ft. wide, plate conveyor. From this temporary skip feeder, rock was discharged into a skip.

The bunker bottom chamber was completed first, a Joy loader being used for moving the rock from the excavation. While brickwork was in progress at the bunker bottom, partial excavation of the bunker top chamber was effected. The excavation here was limited to such size as would allow the boring machine to be erected with the intention of using the hole afterwards for disposal of the remaining rock from the top chamber excavation. The machine used was a Boyle's model BBS 2 surface diamond drill (Fig. 8), with the diesel engine removed, and the machine modified to suit a 25-h.p. electric motor. A 6¼-in. dia. open hole was drilled to a depth of 10 ft., then a 5$\frac{5}{16}$-in. dia. core barrel was run in the hole, giving a 4½-in. dia. core. Core drilling was continued to a depth of 71 ft. 9 in., the core barrel then replaced by a 5½-in. dia. rock

FIG. 8.—BORING MACHINE AT THE TOP OF THE BUNKER.

bit for remaining 6 ft. 3 in. of the hole, which was then reamed out to 13 in. In order to maintain alignment of the reaming, there was a leading pilot reamer plate, 5½ in. dia. The next step was to repeat the reaming process, this time at 19 in. dia. The final stage was to ream with a 24-in. dia. reamer, but only 6 ft. of this work was completed, due to the fact that the machine would not stand up to the strain, and it was decided to withdraw the equipment from the site and sink to the bunker using the 19-in. hole.

The drilling was not completed without difficulties. There was a slight deviation in the original 5⅞-in. pilot hole; consequently, rods were broken at all stages. The tips of bits were badly worn, and at all times, the machine was subject to a large amount of vibration. While using the 19-in. reamer, the driving chain was broken and the hydraulic oil seals gave way; but the greatest difficulty occurred when attempting to ream with the 24-in. dia. reamer, as, during this period, the bevel driving gear was stripped twice. To counter this the speed of the drive was reduced, but progress was much too slow. The driving chain block and the hydraulic oil seals gave way. In all, boring was in progress from December 5, 1957, until January 14, 1958.

The next stage in the process at the bunker top was to excavate for and then to concrete a collar 5 ft. thick. Two concrete mixers, one of ¼-cub. yd. capacity and one of ½-cub. yd. capacity were used. The mix was 4 parts sand, 2 gravel, and 1 cement, and old ½-in. round conductor rope was used for reinforcing. Pegs were left in the concrete collar, from which the first supporting ring of the shaft would be anchored, and girders were placed on top of the collar to support the walls of the bunker top.

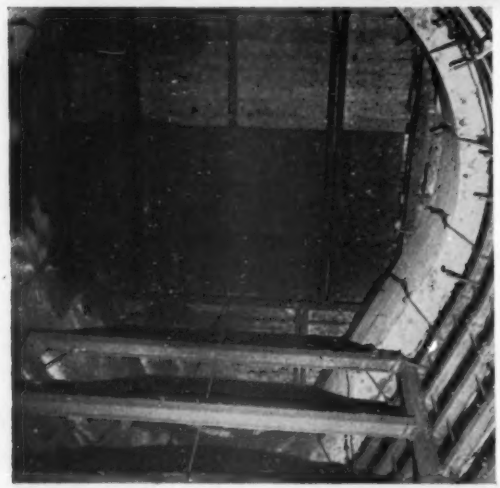


FIG. 9.—UNDERSIDE OF GUILLOTINE DOORS, SHOWING THE BUNKER SUPPORTS.

FIG. 10.—SINKING PLATFORM AND POURING CONCRETE DURING EXCAVATION FOR THE BUNKER.

Upon completion of the collar, the remainder of the bunker top excavation was completed, including the haulage engine house, using the borehole for disposal of the rock. All the rock produced by the sinking was loaded with the Joy loader on to the 30-in. conveyor and then to the skip. The necessary brickwork was then carried out, leaving pockets to provide for girders associated with the temporary covering of the shaft.

While drilling and reaming, placing concrete in the collar and wet drilling for the excavation work at the bunker top, water naturally ran down the borehole, causing weathering to take place in the lower layers of the strata. This caused a certain amount of collapse, and the decision was made to drive a small staple pit upwards. This staple pit, 11 ft. by 11 ft. square, was raised for a distance of 18 ft., while the brickwork of the bunker top chamber was being carried out. Above the 18-ft. point the strata was reasonably strong and upward drivage was discontinued.

At this stage, a haulage engine was installed at the top of the bunker to handle material required during sinking. The bunker was excavated by conventional means, shotholes being placed near the mouth of the 19-in. borehole and the rock flanked off towards the centre. The next row of holes was placed a little further out towards the perimeter, and eventually a series of steps across the floor of the excavation was established.

Both compressed air and electricity were used for drilling the shotholes, according to the strength of the strata. The shots were fired by means of a six-shot exploder. Boring the holes, removal of the debris, and setting of the supports were carried out simultaneously. The sides of the bunker shaft were supported by 6-in. by 5-in. steel joists rolled

to a pear-shaped template, and set at 2-ft. 4-in. intervals (Fig. 9). Each setting was supported from the preceding one by 30 1¼-in. by ¾-in. ties, together with eight pegs, 1½ in. dia. 3 ft. 10 in. long, in addition to the usual wedges. To prevent side thrust, in the finished job, two vertical girders, 8 in. by 6 in., were erected sectionally and 8-in. by 8-in. by 17-ft. long bracing girders set between them at 4-ft. 8-in. intervals.

Due to the sides of the excavation perishing, wedges behind the rings came adrift and the mass of steel supporting work tended to lower. Thus, on reaching the base of the inspection chamber at a depth of 42 ft. it was decided, after making the chamber, to concrete the section of the shaft down to this depth. To effect the concrete lining two sinking platforms were installed, each of these being more or less semi-circular in shape. It was necessary to use two platforms on account of the bracing girders which had been left in across the bunker.

The platforms were supported when in a stationary position by means of 1-in. dia. Lang's lay safety ropes held back on themselves by ⅝-in. dia. U-bolt clams. In addition, each platform was pegged into the side. Lifting of the platforms was by 5- and 3-ton blocks in conjunction with variable lengths of rope. Both lifting ropes and safety ropes were suspended from the underside of the bunker cover. The small side platform was supported by three sets of ropes and the large platform by four. The concrete shuttering used was in 2-ft. 4-in. sections (Fig. 10), and, after erecting the first two shuttering rings, pouring of concrete was commenced. Once this was started, it was continued until the collar was reached. The jobs of erecting shuttering, reinforcing, and fixing boxes to provide holes for the finished spiral girders to fit into, and lifting platforms and pouring concrete were carried out simultaneously.

Three days were spent in setting up the initial 4-ft. 8-in. shuttering plates, installing the initial shuttering boxes and starting reinforcing. Concreting of the top half of the bunker was commenced on June 9 and completed on June 13.

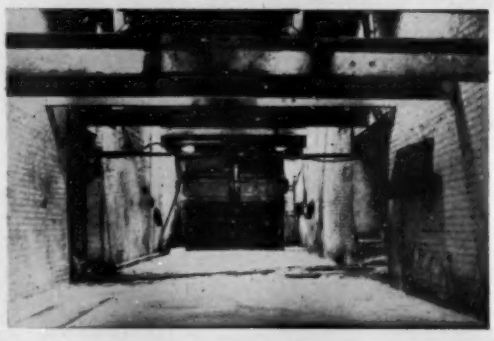


FIG. 11.—RECEIVING ENDS OF SUTCLIFFE SKIP FEEDERS IN THE MAIN BRIGHT PIT BOTTOM.

FIG. 12.—BUNKER BOTTOM IN THE MAIN BRIGHT SEAM, SHOWING CHUTES AND VIBRATORS.

Quick-drying cement was used so that the shuttering could be removed after 24 hr. The concrete was mixed at the bunker top and poured into the bunker through 6-in. dia. Blaw-Knox pipes fitted with flexible joints. With the concreting of the top half finished, sinking of the remaining 38 ft. of the bunker commenced and was completed in nine days. While sinking the bottom half, the platforms were being lowered, and the shuttering in the top half of the bunker dismantled, taken to the bunker top, cleaned, and re-numbered, ready for use in the bottom half.

On reaching the bunker bottom with the sinking, the original supporting girders were removed and the Qualter Hall base erected, set, and concreted in position. Three days after thurling into the bunker bottom, concreting was recommenced, and in four days this had been completed up to the inspection chamber level. After allowing 24 hr. for the concrete to set, the shuttering was removed, this time being lowered to the bunker bottom; the platforms were also lowered to the bottom, dismantled and taken out through the holes in the Qualter Hall base. These were the holes through which the coal and stone from the spirals would eventually be discharged.

While the bunker was being formed, the two identical skip-feeder units (Fig. 11) were installed in the Main Bright Pit bottom. Advantage was taken of the Whitsuntide holidays to get these in, and one of these was put to use immediately in place of the temporary skip feeder for the removal of the remainder of the rock from the bunker sinking.

Phase 4—Holiday Period 1958

To facilitate description in regard to the bunker work, chronological sequence has not been strictly

TABLE 1.—*Progress in Bunker Construction.*

	Date commenced.	Date completed.	Number of manshifts.
Sinking 1st stage of bunker (42 ft.)	April 17	May 21	406
Excavation and bricking of inspection chamber	May 21	May 29	30
Installing Stanton tubes for manway, building bricking platforms, installing ropes and blocks. Setting up initial 4 ft. 8 in. of shuttering, etc.	May 28	June 6	74
Concreting 42 ft.	June 9	June 13	202
Sinking bottom 38 ft. of bunker	June 14	June 23	180
Installing Qualter Hall base. Setting up first 4 ft. 8 in. of shuttering, etc.	June 23	June 25	60
Concreting bottom 38 ft.	June 26	June 30	200
Dismantle shuttering, cleaning boxes, dismantle platform	June 30	July 1	12
Erecting spiral girders	July 2	July 6	136
Erecting bunker top cover	July 5	July 5	15
Erecting spiral chutes	July 6	July 10	136
Building partition wall	July 7	July 12	50
Grouting girder ends and concreting the angled base	July 8	July 12	28
Erecting chutes and vibrators	July 10	July 10	20
Cleaning out bunker and bricking in top cover girder ends	July 11	July 11	8

adhered to. Actually the bottom 15 ft. of the sinking, setting of the Qualter Hall base, and concreting up to the inspection chamber took place during the first week of this holiday period. During the second week the equipment was installed in the bunker. This involved the erection of the bunker spiral girder work and the spiral chutes, the building of the partition wall, and installation of coal and dirt chutes and the Lockers vibrators at the bunker bottom (Fig. 12).

A schedule of shifts taken in sinking and concreting in the bunker together with other ancillary jobs is given in Table 1. To complete installation for skipwinding from the Main Bright Level, a 100-ft. Sutcliffe Crocodile conveyor and hydraulically operated traversing chute was built to convey the mineral from the bunker discharge to the skip feeders.

At the bunker top a 123-ft. long Sutcliffe Crocodile conveyor was installed, together with a Y-chute with changeover doors, shown in Fig. 13, to feed the coal from the top of the drift into the bunker spirals. A 42-in. Sutcliffe GR.6 conveyor, 145 yd. long, was installed in the drift from the Main Bright to the Clowne Seam and a 36-in. gathering conveyor installed in the Main Bright Seam to bring coal to the bottom of the drift.

Results Achieved

With a reorganization of this size there are so many things happening at the same time that it is not always easy to see the contributions made by each isolated improvement to the results of the whole pit, for frequently, the manpower saved on one job has to be used in order to bring about an improvement to another. While it is possible to give results which accrued from some improvements, the scheme as a whole cannot be judged properly until the job has been completed, and the newly provided equipment is working to its designed capacity.

After converting to skipwinding in 1956, there was a reducton of 10 men per 24 hr. in the High Main Pit bottom and a reduction of 18 per 24 hr. on the surface. With the provision of skipwinding at the Main Bright Level, the present seam output of 800 tons saleable daily can be turned on one shift using one onsetter, one transfer point attendant, and one spillage cleaner.

The present figures for output per man shift and cost per ton saleable from the Main Bright Seam are:—Face, 135.7 cwt., labour cost 12s. 11d.; all underground 76 cwt., labour cost 19s. 11d. When considering these figures, it should be borne in mind that there is a large amount of development taking place compared with the coal being produced from the faces.

When the output is built up to 3,000 ton/day and all wound from the Main Bright Level, the underground plant will adequately deal with the output, and in terms of manpower, this will require only two onsetters, two transfer point attendants and one spillage cleaner—a total of five underground. On the surface, two banksmen will be the only persons required to deal with the conveyance of coal from the shaft side to the screens. Table 2 shows the capital and revenue shifts expended over the last three years, and from this some idea can be obtained as to the size of the job.

In conclusion, probably the most outstanding feature of the reorganization is that the jobs have been carried out almost entirely by colliery workmen, and at no time was production impeded. The workmen adapted themselves extremely well to the different type of work involved, and throughout

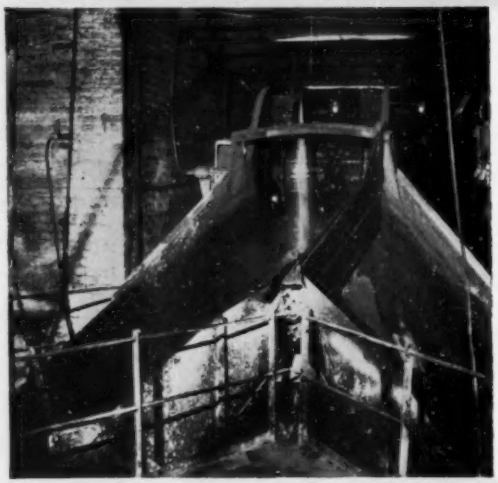


FIG. 13.—THE BUNKER TOP, SHOWING DELIVERY OF SUTCLIFFE CONVEYOR AND Y-CHUTE INTO BUNKER.

TABLE 2.—*Capital and Revenue Shifts Expended.*

—	1956.		1957.		1958.	
	Number of shifts.	Per cent. of total shifts.	Number of shifts.	Per cent. of total shifts.	Up to Dec. 13. Number of shifts.	Per cent. of total shifts.
Surface revenue	63,678	88.80	92,572	98.70	71,798	97.47
,, capital	8,034	11.20	1,222	1.30	1,859	2.53
,, Total	71,712	100.00	93,794	100.00	73,657	100.00
Underground revenue	241,801	94.65	236,523	94.89	209,153	92.02
,, capital	13,674	5.35	12,748	5.11	18,150	7.98
,, Total	255,475	100.00	249,271	100.00	227,303	100.00
Total revenue	305,479	93.36	329,095	95.76	280,951	93.36
,, capital	21,708	6.64	13,970	4.24	20,009	6.64
,, colliery	327,187	100.00	343,065	100.00	300,960	100.00

the fullest co-operation was obtained from them, from officials, and all the many departments connected with the project at Area level.

The author expresses his thanks to Mr. N. Siddall, Area general manager, No. 1 Area, East Midlands Division, NCB, for permission to publish the information contained in this paper. He also thanks the following for their assistance in the preparation of the paper:—Mr. G. Inverarity (Area production manager, No. 1 Area); Mr. T. M. Cope (deputy Area production manager, planning, No. 1 Area); Mr. K. Lancaster (group planning engineer); Mr. A. Clarke (surveyor, Langwith Colliery); Mr. A. Hopkins (photographic department, No. 1 Area); Mr. G. Thompson (mechanical engineer, Langwith Colliery); Mr. L. Dunham (overman, Langwith Colliery); and Mr. D. Jones (Langwith Colliery).

The opinions expressed are those of the author and not necessarily those of the National Coal Board.

DISCUSSION

Replying to MR. R. WEBB, who was interested to know who was responsible for the 24-hr. control of the actual job of underground reorganization, the AUTHOR said the senior staff at the colliery at the time of the reorganization consisted of manager and undermanager. As there was no assistant manager, the 24-hr. control was essentially vested in the senior overman of the colliery, who was a man of outstanding ability. He dealt directly with the manager when necessary thereby allowing the undermanager to concentrate on day-to-day routine work while at the same time keeping a watching brief over the reorganization.

MR. N. SIDDALL asked, if the author had to do another sinking of the sort in question, would he carry it out in the same manner? Would the most suitable centre hole be 24-in. dia., and would a lined borehole be of any advantage?

Provided that satisfactory arrangements be obtained for the rapid disposal of debris from the bottom of the sinking, the AUTHOR said he would most certainly do the sinking in the same manner. The size of the hole bored depended on the strength of the strata and the quality of fragmentation which could be obtained when blasting throughout the length of sinking. In that particular case, the 19-in. dia. hole served its purpose ideally despite the fact that several blockages were encountered.

It was interesting to note that no blockages were caused by large pieces of dirt. As provision against blockages, a 1-in. dia. rope was suspended through the borehole and various sizes of clamps were fitted to the rope to act as "pull-throughs." However, this method of removing a stopping proved to be unsuccessful—either the pull-through came straight through the hole without removing the blockage, or when the next large size clamp was fitted, the strain was such that the rope itself parted. All blockages were ultimately overcome by filling the hole with water.

With reference to the lining of the borehole, the author said it was certainly not necessary in this sinking, but might be necessary where a borehole was passed through either wet or friable strata. He was of the opinion that the method of sinking employed would still be the most economical even if it were necessary to line the hole.

Reasons for Adopting Skipwinding

Referring to reasons for skip decision, MR. C. ROUND pointed out that there were small shafts passing high outputs with mine cars, and he wondered if skipwinding was really the answer.

He also asked why the bunker shaft was "pear" shaped, as there were many circular shafts doing an excellent job.

The AUTHOR, replying, said that when reorganization was planned, the need for large coal was not so pressing as it was now, and the aim was to obtain the maximum efficiency in manpower. He felt that no matter how efficient a mine-car layout might be, it still would not be as economical in manpower as the set-up described in the paper. He also considered that to raise large-capacity mine cars in small-diameter shafts required an unwieldy mine-car construction. The pear shaped design of the bunker arose from a desire to divide the sinking into two parts, one part having twice the volume of the other, and arranging the particular wall and bracing girders in such a position that the maximum strength would be given to the bunker. The author said he doubted, after the experience gained, whether he would advocate a pear-shaped bunker because it needed so many different non-standard parts both in the side supporting girders and shuttering.

In reply to MR. G. A. PERCIVAL, who asked if there was any dust problem due to the skip shaft being downcast, the AUTHOR replied that no serious dust problems had arisen. In the initial stages, there was a considerable amount of dust accumulating at the inset mouth, but that was overcome by fixing high-pressure sprays over the delivery end of the feeder. The sprays were actuated by the skip feeder when loading rapidly.

MR. G. INVERARITY said he thought it might be

emphasized that pit labour had adapted itself exceedingly well to such new tasks and asked the author if accident details were available. The AUTHOR explained that the men selected to do the work had been chosen on account of their abilities and praised the plained that the men selected to do the work had been selected on account of their abilities and praised the men for the co-operative way in which they had undertaken the tasks. During the whole reconstruction period there were three minor accidents.

Replying to MR. D. MARRIOTT, who asked why six-shot batteries were used, and not delayed-action shotfiring, which gave better fragmentation, the AUTHOR said six-shot exploders were used at the outset and these proved very satisfactory for the type of work entailed. In view of the limitation on the speed with which material could be lowered into the bunker, it was calculated that better performances could be obtained if the various jobs were carried out simultaneously. In addition to this, the variety of work helped to maintain the morale of the men employed on this job.

Labour Cost of Sinking

MR. H. PARKES said that the figures provided gave a rather high labour cost in shifts per yard of the sinking. The high cost in shifts per yard of sinking, replied the AUTHOR, was due to the large cross-sectional area of the excavation, its shape, the lack of experience of the men at the outset, the need for a very high degree of accuracy when setting the supporting girders, and the number of boreholes which had to be placed and left in the concreting in order to accept the framework of the spiral supporting girders. In view of these difficulties, he felt that the labour cost for sinking was most satisfactory.

Answering a query by MR. CLAYTON as to whether there was difficulty in maintaining correct alignment of the concrete shuttering for the bunker in view of its pear shape, the AUTHOR stated that difficulty did arise. He went on to explain that where additional excavation had to be made at the side of the bunker a much larger excavation had to be filled with concrete. This additional weight of concrete tended to push the shuttering out of position. It was, however, overcome by tying back alternate segments of the shuttering to the supporting girders by means of 3-ft. long 4½-in. by 4½-in. girders, using 1½-in. dia. bolts. This method adequately overcame the problem.

MR. B. STEPHENSON asked what was the general thickness of the shaft concrete lining, and what was the state of the concrete as it was poured?

The AUTHOR replied that the thickness of the lining varied from 18 to 36 in. A total of some 2,100 tons of concrete was used in the sinking. No slump tests were carried out on the concrete as it was poured.

Forthcoming Events

JUNE 29—JULY 1

Institution of Mining Engineers: Summer meeting in Cardiff. "The Degradation of Coal in Power Loading," by G. V. Standerline and Dr. S. Islwyn Evans, and "Pulmonary Disability Among Coal Miners, with Special Reference to the Pneumoconiosis Field Research," by John M. Rogan.

JULY 25

Institute of Metals: Meeting at the Royal Institution, Albemarle Street, London, W.1, at 6.30 p.m. "The Structure of Metals and Intermetallic Compounds," by Prof. Linus Pauling, of the California Institute of Technology.

Roofmasters in Poland

THE Dowty Roofmaster self-advancing system of roof control is now in operation at Zabzre Colliery in Poland. Situated in the Silesian Basin, the mine is in a rich mineral area which has been worked for the past century. The southern edges of the basin are now being developed to provide gas and coking coals.

The Roofmaster has been installed on a face 60 in. high and 240 yd. long, in conjunction with a 125-h.p. shearer and an armoured conveyor. Installation commenced in late January, 1960, and was completed in only 14 working shifts by 18 men, including two Dowty service engineers. Prior to delivery of the order, six Polish mechanization and maintenance engineers visited the Dowty Ashchurch factories and collieries at which Roofmasters are installed in order to gain practical working knowledge of the equipment. Working conditions were reasonable, with a soft floor, a hard grey shale roof, and very hard abrasive coal. The stables were supported by using Dowty "Duke" hydraulic props and link bars.

Since the Roofmaster was installed, output has risen to an average of 23.5 tons per manshift, with a maximum of 41.6 tons per manshift, giving an output of about 1,650 tons of clean coal per day. Prior to the installation of self-advancing support equipment, using friction props with the Donbass wide buttock power loader, the face output was 5.5 tons per manshift. This represent a fourfold increase in o.m.s. After the armoured conveyor and Anderton shearer loader were in position, installation of the Roofmaster units was accomplished by means of three winches situated in the middle of the face, the supply and loader gates. Units were built up on the roadways and winched along the face to the centre where they were installed outwards in each direction after removal of the friction props.

Roofmasters in Poland have aroused great interest in eastern Europe; Russian and Czechoslovakian delegations are among those who have visited Zabzre to see for themselves the new equipment in operation.

NACM: South Staffs Branch

MR. T. L. CARR, production manager of the Warwickshire Area of the West Midlands Divisional Coal Board, is the new president of the South Staffordshire, Warwickshire, Worcestershire, and Shropshire Branch of the National Association of Colliery Managers. He was elected at the annual meeting held on April 28.

The vice-presidents are Mr. A. Lomas, Mr. J. Smilie, Mr. J. Eltringham, Mr. F. L. White, Mr. C. Kitchen, and Mr. J. Every.

Other officers elected were:—

Council: Mr. H. D. Gilham, Mr. W. Crossland, Mr. R. Ward, Mr. J. Evans, Mr. G. Milne, and Mr. G. Schofield.

Secretary: Mr. R. J. Hasbury.

Treasurer: Mr. J. H. Wilkinson.

Representatives to national council: Mr. T. L. Carr and Mr. A. Lomas, with Mr. W. A. Machin as deputy.

POWER PLANT DEVELOPMENT AT STEEL COMPANY OF WALES

Britain's First

BENSON "ONCE THROUGH" BOILER

BEGINNING his four-day tour of Welsh industry last week, Mr. Richard Wood, the Minister of Power, inspected the new Benson boiler installation at the Margam works of the Steel Company of Wales, Limited. The installation of this boiler, together with a back pressure turbo-alternator, is a major advance in industrial steam usage in this country. The original Benson boiler was developed in Germany from designs patented in Britain by Mark Benson 38 years ago.

Proposed "M" scheme extensions planned for the company's blast furnaces, coke ovens, and steelmaking plant within the Margam and Abbey works would create an additional steam demand of approximately 200,000 lb./hr. This extra steam was needed for driving turbo-blowers for the furnaces, for generating electricity, and for processing.

Two schemes for extending the plant were considered. One was to install a straight 200,000 lb./hr. water-tube boiler steaming at 625 lb./sq. in., similar to the existing boiler, and an axial flow condensing turbo-blower. The other proposal was to include a "topping" installation comprising a Benson boiler and a back-pressure turbo-alternator. After careful consideration it was the latter scheme which was adopted.

Firing of Boiler

This new boiler at the Margam "B" power station was designed and built by Simon-Carves, Limited, Stockport. It is housed in a building some 200 ft. high with a 280-ft. high chimney alongside. Although commissioned only a few days before the visit, it was already running on full automatic control. The boiler is fired by either blast-furnace gas or oil or mixtures of these fuels and is capable of generating 240,000 lb. of steam per hr. at a pressure of 3,300 lb./sq. in. and 1,060 deg. F. with reheat to 836 deg. F. Such advanced steam conditions have only before been used commercially at a few major power stations and industrial steam plants on the Continent.

The Benson boiler will power what is believed to be the highest pressure turbine ever manufactured in Britain. Built by Richardsons Westgarth, Limited, the turbine will produce an alternator output of 9.5 MW, and will therefore result in a considerable reduction of electricity now being taken from the National Grid. Normally 200,000 lb. per hr. of exhaust steam from the turbine will, after reheating, be discharged into the existing 650-lb./sq. in. system from which two turbo-blowers and an alternator are driven.

Because of its efficiency, it is intended to operate the boiler/turbine unit as a base load set. When necessary to alter the boiler/turbine load from its optimum setting a manual load setter is operated. This varies simultaneously the feed water and fuel flow to the boiler.

Operating Features of the Benson Boiler

The Benson boiler is a water-tube forced circulation boiler in which the feed water is heated, evaporated, and superheated in a single passage through a number of tubes in parallel. For generating steam at high pressures, whether above or below the critical pressure, it has many advantages over boilers using natural or assisted circulation, and the higher the steam pressure the more pronounced the advantages.

Benson boilers can be designed and built for operation at pressures up to the order of 5,000 lb./sq. in. and with steaming capacities suitable for any purpose from small industrial plants to the largest central power stations.

The Benson boiler at the Margam "B" power station has steam and fuel conditions as follow:—

Steam pressure at superheater outlet	3,300 lb./sq. in.
Steam temperature at superheater outlet	1,060 deg. F.
Feed water temperature at economiser inlet	280 deg. F.
Continuous maximum rating	240,000 lb./hr.
Quantity of steam to the reheater	205,000 lb./hr.
Steam pressure at reheater inlet	650 lb./sq. in.
Steam temperature at reheater inlet	675 deg. F.
Steam pressure at reheater outlet	628 lb./sq. in.
Steam temperature at reheater outlet	836 deg. F.

Blast-furnace gas:
Gross calorific value—92 B.Th.U./cu. ft. at 32 deg. F and 30 in. Hg.
Fuel oil:
Gross calorific value—18,000 B.Th.U./lb.

The output of the boiler can be obtained when burning either of these fuels or a mixture of both.

The boiler is arranged with four passes, each directly behind the other (see Fig. 1). The heating surfaces consist exclusively of small-bore tubes (1¼ in. to 1½ in. o.d.) which are connected to each other and to the headers by welding.

The first pass comprises the combustion zone, the four walls of which form the radiant superheater. Above it is the first evaporator section, followed by the final convection superheater in two sections. Above the superheater is a further evaporator surface in three sections. In this latter surface is the transition zone where the change of state from water to steam takes place. The connecting tubes between the two sections of the final convection superheater are crossed, as also are the

connection tubes between the second and third sections of the evaporator sections.

The second pass comprises the reheater sections, arranged in parallel, each section comprising two banks of tubes. The third pass comprises the secondary economizer sections arranged in parallel, each section comprising three banks of tubes. The fourth, or rear, pass comprises the secondary tubular type air heater; the primary economizer sections are arranged in parallel, each section comprising four double-flow banks of tubes, followed by the primary tubular type air heater.

The total resistance of the boiler and superheater circuit is overcome by the feed pump delivery head, and this governs the final steam pressure. The variation in this delivery head, by the feed throttle valve, gives the facility to operate at less than the design pressure, which is an advantage in starting up the main turbine either from cold or hot.

The firing rate is automatically matched to the rate of feed flow, and therefore the final steam temperature is governed by the firing rate with a trimming control from spray type de-superheaters, which form part of the boiler circuit. In this way, also by varying the firing rate, the steam to the turbine can be at less than design temperature, which is a further advantage in running-up the turbine.

A gas recirculation fan is provided to obtain a balance between the superheater temperature and the reheater steam temperature when burning oil fuel.

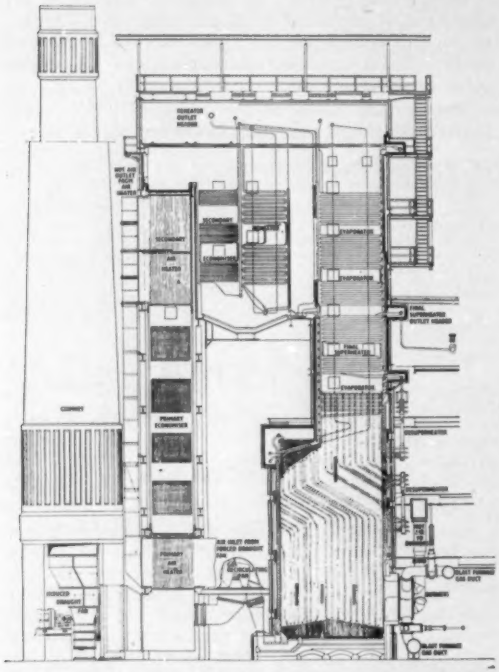


FIG. 1.—CROSS SECTION OF THE BENSON BOILER AT THE "B" POWER STATION AT THE MARGAM WORKS OF THE STEEL COMPANY OF WALES.

The reheater steam temperature is controlled by dampers in the upper rear wall of the first pass, which control the quantity of gas flowing firstly over the upper evaporator banks or partly bypassing the evaporator upper banks and flowing over the reheater banks. The unit has great flexibility as regards load variation, and so makes possible a starting up and shutting down procedure which can be very satisfactorily matched to the turbo alternator.

Control Methods

Fuel and Combustion.—In deciding the method of control or regulation of the boiler the following points had to be considered. The boiler is arranged for blast-furnace gas or oil firing or any mixture of these two fuels. The boiler will normally burn as much blast-furnace gas as possible, but due to gas demands on other parts of the plant or the unexpected reduction in supply the total fuel input is maintained by automatic increase in the fuel oil firing rate. This precaution requires a "pilot" fuel oil flame of approximately 10 per cent. of the total fuel burnt.

It is not possible to use a steam flow/air flow control for the determination of combustion efficiency as the stoichiometric quantity is different for each fuel. The method adopted at Margam is to measure the quantity of each fuel supplied to the combustion chamber and to control the forced-draught fans to supply a total quantity of air equal to the sum of air required for each fuel.

Blast-furnace gas and oil can be fired in any proportion giving wide variations in the flue gas optimum CO_2 content; an O_2 meter is used as a reference to the air supplied to the boiler.

Boiler and Turbine Unit.—Established practice for normal boiler/turbine plant control which cannot apply in this case is for the alternator output to be varied through the speed governor of the turbine while the automatic equipment of the boiler varies the feed and fuel input to maintain preset steam pressures. The turbo-alternator at Margam is arranged for pressure governing (with over-riding speed-governing for safety), the boiler ouput being varied by an adjustable load setter on the boiler panel. The alternator is then supplied with more or less steam according to the boiler output, the pressure being controlled by the turbine governor valves through an Askania relay unit.

The feed pump output now controls the boiler load and the final steam temperature is dependent on the fuel/feed water ratio with final and more rapid trimming obtained by two stages of spray de-superheating.

Boiler Control System.—The boiler can be operated fully automatic as indicated later or automanually in which case the valves, vanes, dampers, etc., are actuated by electric motors, but controlled by switches operated by the boiler supervisor at the

desk. The supervisor is then in complete control of the boiler utilizing indicators and recorders of boiler conditions located in the control room.

On fully automatic control the boiler output is adjusted by the load setter, which consists of a series of rheostats driven by a pilot motor operated from the control desk. The rheostats send out immediate signals of load changes to the fuel controller, with delayed signals to the feed water and steam temperature (spray water) controller. These signals are proportional to the required boiler conditions.

The delay in sending out the latter signals ensures that on a rising load the combustion chamber does not cool too rapidly and conversely on falling load the fuel is reduced before the feed water, thus safeguarding against a too rapid rise in temperature.

The h.p. steam temperature is regulated by injecting spray water in two stages. The valve on the first stage is controlled by a signal from the load setter which has been balanced against a signal of the measured temperature obtained from a thermocouple in the first stage de-superheater. The final de-superheater temperature is controlled by a spray valve in the second stage de-superheater; this valve being directly controlled from a thermocouple in the final steam flow.

The forced-draught fans supplying combustion air are controlled as follows. The quantity of each fuel is measured and a total quantity of air equal to the sum of the air required for each fuel is supplied to the boiler.

High-pressure Back Pressure Turbo-alternator

Turbine.—This machine is designed for a terminal output of 9,250 kW. when supplied with 240,000 lb./hr. of steam at 3,000 lb./sq. in., 1,050 deg. F. and exhausting at 650 lb./sq. in., 670 deg. F. The turbine rotor runs at 9,500 r.p.m., is 6 ft. 6 in. between bearing centres and weighs 1,300 lb. A general view is shown in Fig. 2. The turbine cylinder is of double walled construction comprising an inner cylinder and flanged outer cylinder of total weight 4½ tons. Steam from the boiler is received at a strainer placed on the centre

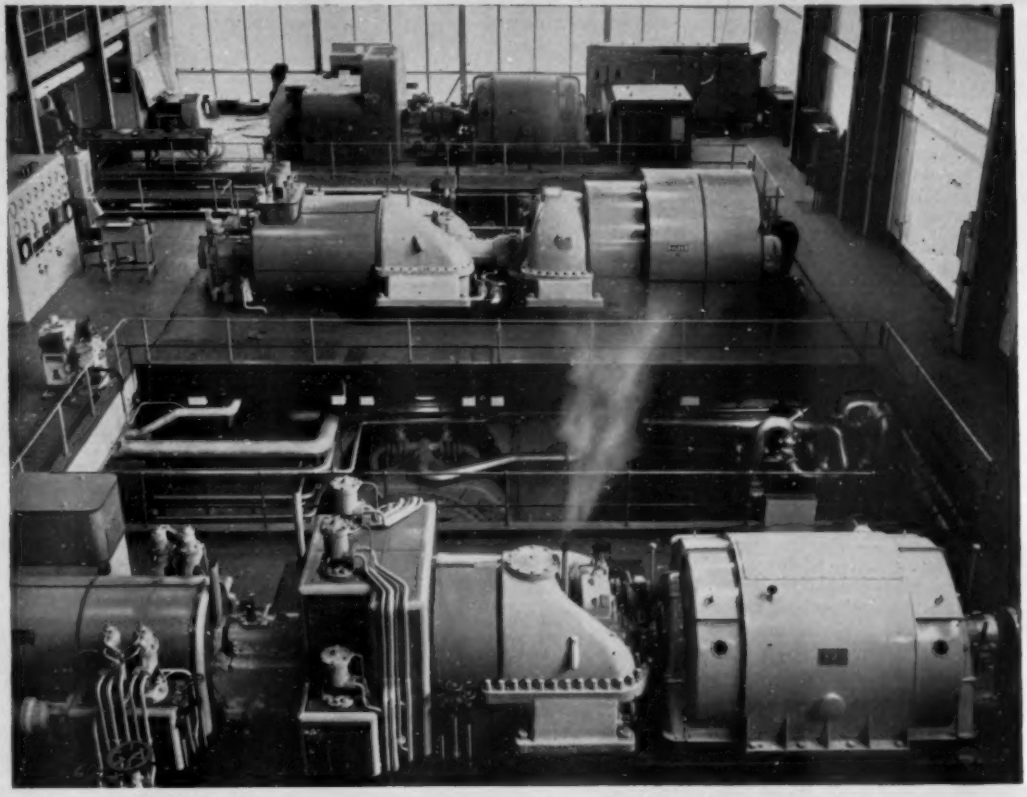


FIG. 2.—GENERAL VIEW OF THE TURBO-BLOWERS AND TURBO-ALTERNATORS AT THE "B" POWER STATION AT THE MARGAM WORKS OF THE STEEL COMPANY OF WALES.

line of the machine under the anchor point and the strainer is connected to single-seated combined stop and emergency valves each of which is in an integral chest with two single-seated nozzle valves. The chests are located at each side of the turbine at the front end.

The turbine rotor carries a single row of impulse blades welded to a disc turned on the rotor and this wheel is followed by 14 rows of reaction blading. All the reaction blades are machined from solid bar with integral shrouding and are welded together at the shrouding in packets of three or four. The dummy piston carries 39 gland strips and there are 30 gland strips at each end of the rotor.

The high steam pressures and the use of single-seated valves necessitates the use of h.p. oil to actuate the servo-motors and this oil is supplied by a pump driven from the front end of the turbine. Lubricating and governing oil is supplied by a conventional gear type pump also driven from the front end of the turbine. Motor-driven auxiliary pumps are provided for starting and emergency use.

Speed and load governing is done by a conventional centrifugal type governor and an Askania regulator is also provided so that the load may be governed by the boiler pressure.

Reduction Gear.—The speed-reducing gear comprises an epicyclic gear of the double-helical sun and planet type, arranged so that the load is shared equally between the planet wheels and the primary and secondary shafts lie on the same axis, with opposite directions of rotation.

The high-speed shaft incorporates a tooth-type coupling, as well as the coupling for bolting to the turbine shaft, while the low-speed shaft terminates in a solid half-coupling, which is bolted to a similar coupling mounted on the end of the alternator rotor. The gearbox bearing at this driving end is enlarged to carry the weight of the alternator rotor.

Alternator.—The alternator is of the standard turbo-type with direct coupled exciter and is capable of delivering a maximum output of 9,500 kW. continuously when delivering three-phase electrical energy at the pressure of 10,500/11,500 V., a power factor of 0.7 lagging and a frequency of 50 cycles/sec., when the rotor is running at a speed of 3,000 r.p.m.

The construction of the machine is entirely conventional, the ventilator system comprising a fan mounted at each end of the alternator rotor, together with a closed circuit air cooler.

Russia's New Rolling Mill

Now being built at Magnitogorsk, in the USSR, a wide-strip mill will produce steel sheets for the manufacture of welded tubes of large dimensions and for use in the motor and tractor industry. The first section is scheduled to be put into operation in January, 1961, but is likely to be completed ahead of time to celebrate Soviet Constitution Day on December 5.

Book Review

Physical and Engineering Properties of Cast Iron. By Dr. Harold T. Angus, deputy director of the British Cast Iron Research Association. Birmingham: British Cast Iron Research Association, Bordesley Hall, Alvechurch. 528 pp. Nearly 150 illustrations. 52s. 6d. to members of the association; 73s. 6d. to non-members.

IN the long history of cast iron much has been written on the metallurgy and applications of the material; engineers and designers frequently find it necessary to consult a large number of works to obtain information they require. The 500 pages of "Physical and Engineering Properties of Cast Iron" contain a wealth of information on the behaviour, properties and engineering applications of cast iron.

The book originated in a private collection of data which the author acquired over a wide range of industrial experience and from problems submitted to the development department of the BCIRA. Almost every item of information included in the book has been requested at some time or another. The accumulated experience contained in it should therefore be of practical value to those who are dealing with the day-to-day problems of ironfounding and engineering as well as to research workers, technical colleges, and technical reference libraries.

The book is divided into nine parts:—Constitution and structure; mechanical, physical, and electrical properties; general properties of commercial cast irons; special properties affecting surface, such as heat and wear resistance, machinability, etc.; heat treatment of grey cast iron; internal casting stresses; components with high local loadings; cast-iron beams, columns, pipes, cylinders, and pressure vessels. The last part is devoted to the application of specifications and data to design.

The text is well illustrated with plates, diagrams, and graphs, and supporting data are presented in convenient tabular form. There is an excellent selection of references to original and standard works.

CORRESPONDENCE

POURING PRACTICE OF SLAB INGOTS

To the Editor of THE IRON AND COAL TRADES REVIEW

SIR,—With reference to the article "Effect of Pouring Practice of Slab Ingots and Rolled Products" in the May 27 issue of IRON AND COAL (pp. 1181-1183), I should like to mention that slab ingots of undulated surface and up to 7 tons weight were up-hill poured through two inlets into bottomless moulds in Hungary after the war. The effect was a reduction of longitudinal and transverse cracks and improvement of the ingot surface. Besides these, a marked increase in the life of ingot moulds was also noted. The improvements were almost certainly due to the change from a single inlet to a double inlet pouring system.

I should like to draw the attention of the readers of IRON AND COAL to the steel girdle in the upper part of the ingot mould shown in Fig. 1. Such steel girdle inserted into the top part and/or more often into the bottom part of the sand mould before casting would also have a beneficial effect on the life of the ingot moulds according to Hungarian experiences.—Yours faithfully,

DR. P. KÖVESI.

Broomhill Hotel,
583, Crookesmoor Road,
Sheffield, 10.

The National Metallurgical Laboratory at Jamshedpur

THE NEW PILOT PLANT TECHNOLOGICAL BAY AT THE NATIONAL METALLURGICAL LABORATORY.

THE second and third Five-Year Plans have set the pace of India's industrial development. The challenge is there and how far India will be able to meet it will depend to some extent on foreign aid, but largely on the effort which India herself is making in the fields of industry, agriculture, and education. Industry figures prominently in both the second and third Five-Year Plans and the National Metallurgical Laboratory plays, and will continue to play, an important part in maintaining the high rate of progress needed to raise the national standard of living.

Against a background of fundamental long-term research, a programme of experiment and investigation is under way which is aimed at the solution of specific problems. While these problems are by no means peculiar to India, they are prominent among the reasons for the very existence of the laboratory. To appreciate the importance of the work in hand, it must be considered in context. One or more of the three basic conditions existing in India gives rise to the need for the wide variety of investigations now in hand.

By M. D. J. BRISBY* and J. DOBIE*

Each of these conditions poses its own problems:—

(1) The need to reduce foreign exchange payments. (The NML produced a nickel-free stainless steel to reduce nickel imports.)

(2) The fast rate of expansion in the steel industry. (The laboratory designed and built an LD converter to gain knowledge about the performance of Indian basic refractories in relation to LD oxygen steelmaking.)

(3) The distribution of suitable mineral deposits imposes limitations on the ultimate pattern of heavy industry throughout the country. (The NML has established a low-shaft furnace pilot-plant project to investigate smelting of India's iron ores with non-metallurgical coals including the use of lignite.

The National Metallurgical Laboratory was established by the Council of Scientific and Industrial Research. Since its formal opening in November, 1950, by the Prime Minister of India, Mr. Nehru, the laboratory has rapidly gained in reputation and its work has had a considerable influence on the industries it serves.

Organization

The NML has nine main divisions besides service, workshop, and engineering design departments. It co-operates as much as possible with other Council of Scientific and Industrial Research institutions (particularly on fundamental research) and operates a widely used information service to the industries it serves. A system of industrial fellowships is operated to provide facilities for undertaking specific industrial problems.

Approximately 650 men are employed at the laboratories, this number including administrative staff.

Five-Year Plans—Keeping Pace

The broad commitments of Indian heavy industry under the past and current Five-Year Plans have been relatively clear. The means of achieving the targets, standards of development, and levels of production are frequently less clearly defined and it is in this field that the NML is particularly active. Much of the work done at the laboratories is closely related to the immediate and imminent needs of industry and it can be said that the National Metallurgical Laboratory is to some extent required to find answers to questions before the questions are posed.

* Of W. S. Atkins & Partners, consulting civil engineers, London, S.W.1.

EXPERIMENTAL COMBINATION ROLLING MILL INSTALLED AT THE NML.

Equipment.—The volume and diversity of the research work in hand place heavy demands on the laboratory's facilities. With an eye to foreign exchange and functional flexibility, the National Metallurgical Laboratory has added to the original equipment (worth several hundred thousand rupees) by designing a wide range of special purpose instruments and actually constructing them at the laboratory. These items include a hydrogen determination apparatus (down to 0.000005 per cent. H), a vacuum fusion gas analysis unit, and an accelerated fatigue tester.

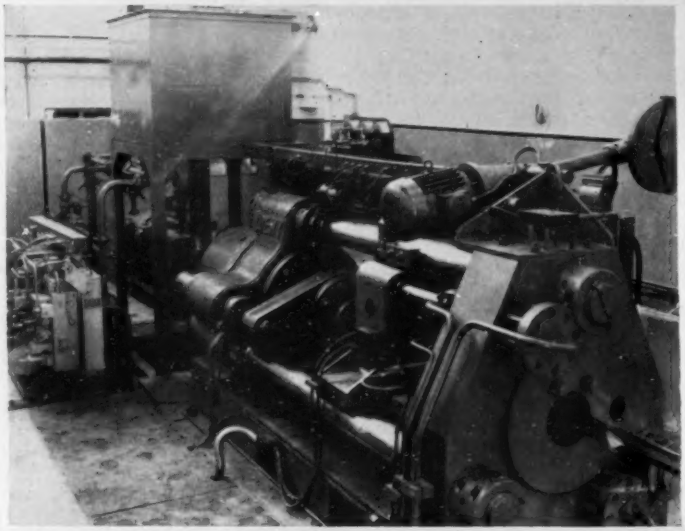
Broad Approach. — Researches are by no means confined to the ferrous industries' problems and much work has been done in the fields of bi-metal research, the development of tinless bronze, aluminium-silicon alloys, nickel-free coinage alloys, nickel-free heating elements, electro metallurgy of manganese, and new plating techniques. Investigations into the suitability of various Indian foundry sands have been made and methods of improving them by washing and grading have been developed.

Pilot Plants

The highlight of the current phase of research and development work in progress is the implementation of research results and the pursuit of pilot-plant projects.

The Low-shaft Pilot Plant.—The plant, the first of its kind in Asia, was completed in 1958, since when it has been engaged in an intensive study of the possible uses of the vast reserves of soft ores, high-ash coal, and lignite which are spread throughout India. The furnace has a capacity of 15 ton/day and is capable of treating various combinations of low-grade materials. In addition to pig-iron production, it is envisaged that furnaces of this type will be able to produce both standard and exportable grades of ferro-manganese. A successful conclusion to these investigations will assist in the establishment of small iron and steel producing units throughout India. Equipped with its own briquetting plant, the furnace, supplied by Demag-Humboldt, operates on a variety of raw materials with a total daily requirement in excess of 100 tons. The briquettes are composed of ores, limestone, and non-coking coals and are bonded with coal tar pitch, etc. Approximately 6 tons of briquettes are required to produce 1 ton of iron.

The furnace is carbon lined to hearth level and is blown by turbo-blower, the blast being pre-heated by recuperator to about 600 deg. C. A comprehensive series of tests is under way involving



500-TON EXTRUSION PRESS FOR BILLETS ¾ IN. TO 4 IN. DIA. AND 14 IN. LONG INSTALLED AT THE NML.

briquettes of various composition and interim results are such that several Indian States governments are showing keen interest in the possibility of its use. Valuable and encouraging results have already been obtained in the production of foundry grade pig-iron from 100 per cent. non-coking coals from the Raniganj area using iron-ore fines, etc.

LD Converter.—The laboratory's experimental LD vessel is the first in India. It has already yielded useful information on basic refractories for use in oxygen steelmaking. Many of the pilot and semi-pilot installations at Jamshedpur are engaged in research into the manufacture, substitution or exclusion of materials normally imported. Of these ventures, perhaps the most significant is that which has resulted in a range of nickel-free austenitic stainless steel. Current imports of austenitic stainless steels are in the region of 6,000-7,000 tons a year. The newly developed varieties which, for certain applications replace the usual 18-8 nickel variety will, when in production, bring a worthwhile relief to foreign exchange problems.

The production of electrolytic manganese and manganese dioxide is receiving much attention and analysis of the heavy dioxide deposits on the manganese cells has proved it to be eminently suitable for dry cell manufacture. When it is noted that the electrical industry imports 5,000 tons of manganese dioxide a year for battery manufacture alone, it will be clear that another substantial saving of foreign exchange will be made when the process is exploited commercially. It is now understood that the process is being passed on to industry on payment of royalties and several other processes have already been passed on such as carbon-bonded graphite crucibles, mullite refractories, etc.

LD CONVERTER—DESIGNED AND FABRICATED AT THE NATIONAL METALLURGICAL LABORATORY — IN OPERATION.

TAPPING OF PIG-IRON FROM LOW-SHAFT FURNACE PLANT.

A problem facing the mining industry in many countries is the depletion of the high-grade ores and the need to beneficiate the lower grade ores available. Since its inauguration, the laboratory has conducted a comprehensive programme of ore beneficiation research. The results of this research are of very great importance to the low-shaft furnace project as they will influence decisions regarding the siting of future low-shaft units.

Other pilot plants of equal importance in operation relate to the production of refractories from indigenous raw materials, the production of aluminized wires based on the hot dip aluminizing techniques patented by the laboratory, and the rolling and extrusion of metals.

Liaison and Information Services

Aid to Industry.—Up to 200 technical queries a year are received from a wide range of industries and many of these involve considerable study including detailed scrutiny of published work and the compilation and presention of statistical data.

Investigations carried out at the request of industry include specification tests, quality control studies, and investigations and reports on causes of failure in plant and equipment.

Publications.—To date, the National Metallurgical Laboratory has contributed over 300 papers to the journals of the world and since February, 1959, has published its own quarterly NML Technical Journal, Proceedings of the Symposia, and

Monographs on Beneficiation of Low-grade Manganese Ores, etc.

Patents.—The laboratory has at present more than 36 patents covering processes and techniques developed at the laboratory. These patents cover a wide range of subjects including refractory manufacture and utilization, welding fluxes, and a hot-dip aluminizing process.

The background to these developments has, of course, been consistently and closely related to indigenous material and in many cases what would appear to be marginal benefits are, in fact, considerable in that the use of an available material will, apart from bestowing a value on that material, reduce or eliminate the need for a material which has hitherto been imported. With a view to benefiting the smaller industries, several patents have been released free of royalty for incorporation in small- and medium-sized works without heavy capital outlays being necessary. These patents relate to plating and metal finishing.

Processes for electrolytic manganese production, improved refractory composition, and liquid gold production are among others which are now fully developed and ready for commercial exploitation.

Liquid gold is widely used in India by the glass and ceramic industries for decorative purposes and the industries' requirements are currently met by imported material. Clearly, the policy of reducing the foreign exchange burden extends to even the most obscure corners of the Indian industrial scene.

An annual event of importance to all metallurgists in India is the metallurgical symposium held every year at Jamshedpur. These events are organized by the National Metallurgical Laboratory and a measure of their importance will be gauged by the attendance this year at the 9th International Metallurgical Symposium, held in February, with 10 oversea countries represented at the technical sessions.

MEMORIAL TO

Sidney Gilchrist Thomas

WHILE it is accepted by the British iron and steel industry that a very great debt of gratitude is due to Sidney Gilchrist Thomas, who, assisted by his cousin, Percy Carlyle Gilchrist, experimented at Blaenavon (Mon) and as a result of those experiments gave the world the now universally used basic process of steelmaking, it is not always recognized that another great industry, that of agriculture, owes an equally large debt to these same pioneers. Thomas, with his basic process, produced the first basic slag and immediately recognized and emphasized its value as a fertilizer.

Even when the grim shadow of death was close at hand, Thomas still worked on perfecting basic slag as an aid to agriculture.

The work of Sidney Gilchrist Thomas, the young London Police Court clerk, who, in his short span of life (1850-85), made untold wealth for many nations, is a wonderful story of keen perception, perseverance, skill, and fortitude. It is rather strange that the term "basic Bessemer" has been used in Great Britain, while on the Continent this widely used method of steelmaking is universally known as the "Thomas" process. Today, most of the steel produced in all countries is produced by the basic process and it is an incontrovertible fact that the basic steel process was first brought into being at Blaenavon.

The Newport and District Metallurgical Society, which has a membership of approximately 400 drawn from the iron and steel and allied industries of South Wales, decided to erect a memorial to Thomas and Gilchrist at Blaenavon and thus to perpetuate the memory of these two great steel pioneers. Under the leadership of the president of the society, Mr. G. H. Latham, chairman of the Whitehead Iron & Steel Company, Limited, and deputy chairman of Richard Thomas & Baldwins, Limited, an appeal for funds was made to the iron and steel and allied industries. The response has been very gratifying and, in conjunction with the Iron and Steel Institute, a trust fund has been established to be known as the Sidney Gilchrist Thomas Trust Fund.

The income from this fund will be used to establish travelling scholarships and prizes for metallurgical students.

In addition to substantial donations from steel companies in the UK, the German iron and steel industry has also promised a donation of about £4,000.

The memorial, an obelisk in polished red granite with native blue pennant stone base and walled-in surround, bearing a lifelike bronze head of Sidney Gilchrist Thomas in heavy relief and a bronze panel recording the achievements at Blaenavon, is nearing completion. The memorial will be unveiled on July 6 by the president of the Newport and District Metallurgical Society. Representatives of the iron and steel and allied industries of Great Britain and other countries will attend the ceremony.

The memorial will be erected as near to the actual place of the early experiments as possible, in the premises of Daniel Doncaster & Sons, Limited, Sheffield, which now owns the site of the old Blaenaovn Iron & Steel Company.

Electrical and Mechanical Engineering at Coal Mines

Jubilee Convention of the AMEME

Tribute to the part played by electrical and mechanical engineers in developing Britain's coal-mining industry was paid by the Minister of Power and the chairman of the National Coal Board at Blackpool last week. Mr. Richard Wood and Sir James Bowman were attending the annual convention of the Association of Mining Electrical and Mechanical Engineers, which, founded in 1909, has this year been celebrating its golden jubilee.

LANCASHIRE's famed seaside resort was appropriately chosen as the venue for this golden jubilee convention of the AMEME, for it was at a meeting in the same county—at Manchester on December 17, 1909—that the association officially came into being. To mark additionally the special nature of the occasion the period of the convention was extended from the customary three full days to four days, opening with an informal reception at the Norbreck Hydro on the Monday evening and concluding with the annual banquet and ball at the same hotel on Friday evening. With members, their ladies, and guests, the company at Friday's banquet numbered almost 600.

Newly elected president in this golden jubilee year—and a Lancashire man withal—is Mr. A. E. Crook, chief engineer (production) of the National Coal Board. The Thornton Lecture this year was given by Mr. B. L. Metcalf, director of engineering of the NCB, who took "Technology and the Future" for the title of his lecture, which he is to repeat at five other centres throughout the country. Other technical papers read during the convention were "Mechanical and Electrical Maintenance at the Netherlands State Mines," contributed by Ir. W. E. van Os and Ir. M. Kneepkens, and "Organization of the Engineering Services at a Modern German Colliery," by Dr. E. Anderheggen, of Friedrich Heinrich Colliery, West Germany.

Specialized Problems

Although he could not hope to cover all of them, Mr. Metcalf dealt with most of the advances which technology can help electrical and mechanical engineers to make in their work—"in our attempts to extract coal from the earth efficiently and to give a satisfying job to the thousands of men and women employed in the industry and a safer and pleasanter working life for those who have to work underground."

To help with their specialized problems engineers must also harness for their own benefit the vast range of improvements being made in allied fields—in metallurgy, in the use of man-made fibres and other synthetic products, in mechanical and electrical machine design, in instrumentation, in communication, in the medical field in the use of electronics and hydraulics. An interplay of technologies was essential to rapid progress, Mr. Metcalf declared. A rapid advance in technology on the production side needed good technologists, good mining-mechanical and mining-electrical engineers, good mechanics and electricians of the mine, good craftsmen, he added.

All the new and complicated machinery and apparatus must be well maintained, safe to operate, reliable, efficient, and suited to its purpose. There must be a strong and adequate engineering organization to back up the mining operations. Information must be accurate and readily available, communications must be improved, and there must be a proper assessment of costs so that the value of any new technological advance could be accurately predicted.

Machines without the men to look after them who understood both their purpose and the principles on which they operate were merely a costly encumbrance. The AMEME had a great part to play in guiding the education and training of those men and in stimulating their desire to improve their scientific and technical skill. Only when such men were recognized as equal partners in the daily struggle to win coal safely and economically would sufficient mechanical, electrical, and civil engineers, sufficient mechanics, electricians, and craftsmen, of the right calibre be attracted to the industry.

In Holland—and Germany

Mr. van Os and Mr. Kneepkens concluded their description of the organization and performance of the mechanical and electrical maintenance services at the Dutch State Mines with a few thoughts on the future.

With the coal-face equipment at present available the aim was to reduce the number of standstills and thus raise the rate of utilization. That, of necessity, tended to more preventive maintenance and repair. A further increase in the daily advance and lengthening of the face necessitate the development of heavier and faster machines. Mechanically, that meant that still higher power would have to be accommodated in the same overall dimensions

of the equipment, which in practice was only possible by a still greater application of special materials and designs. That, too, was likely to cause a rise in maintenance per unit of production.

A further growth of the central workshop was to be expected, since the reduction in repair time would be greater for concentrated units than for a number of separate units.

Dr. Anderheggen's paper dealt with the organization and functions of the engineering service underground and on the surface at Friedrich Heinrich Colliery, which has an annual attainable output of 3,000,000 tons of clean coal, and was claimed by the author to be one of the most efficient coal mines in the German Federal Republic. This efficiency has been achieved by a thorough mechanization of operations underground and on the surface.

Underground, the engineering service, like the mining and safety sections, is a separate works department and is divided into the mechanical and electrical services. Some 450 mechanics and electricians are employed underground out of a total staff of about 4,050 workers.

Presidential Address

In his presidential address, Mr. A. E. Crook dealt with "Electrical and Mechanical Contributions towards Efficiency and Safety in the Coalmining Industry." He said that throughout the first half century of its existence the association had striven to raise the standard of safety and efficiency of mining-electrical and mining-mechanical engineering, and to raise the status, experience, and efficiency of the engineers and technicians. It had done so through its examinations for certificates of qualification, efforts leading to the statutory certification of engineers and technicians at mines, training and education, and also through the promotion and dissemination of information.

The AMEME had 24 branches throughout the coalfields in Britain, Australia, and India where regular meetings were held so that engineers, technicians, and scientists from the industry, the manufacturers of apparatus, the research and educational establishments, and the statutory authority might freely discuss technical papers and relevant aspects of mining-electrical and mining-mechanical engineering. Indeed, there was nothing comparable within the industry where those technological matters could be discussed by the engineering personnel concerned at every level. Local branches would have an even greater part to play in the future than in the past.

NCB Chairman's Address

Sir James Bowman, chairman of the National Coal Board, addressed the conference on Friday morning. He welcomed the opportunity of thanking the association for its services to the mining industry, and congratulating it on so successfully achieving its objectives of increasing the efficiency and experience and improving the status of its members during the past 50 years.

The progress in the two important branches of engineering fostered by the association over the half century of its existence had been swift and revolutionary, said Sir James. In the early years of the century, before the association came into being, safety precautions in the use of electrical equipment in the mines were rudimentary or nonexistent. The immense potential benefits to be gained from the application of machines to traditional mining practices had hardly begun to dawn upon the industry. Electrical engineers were still looked upon as very minor creatures in the hierarchy of the colliery.

Over the years since then, members of the AMEME had been at the forefront in leading the development of revolutionary new machines and techniques for use in the mining industry, learning from the failures of some of the primitive apparatus introduced in the early days, and striving constantly to improve the safety and performance of electrical plant used underground. The exchange of new ideas and the spread of knowledge sponsored by the association had contributed greatly to the improvement in the general level of technical ability among electrical and mechanical engineers all the way through the industry. The association had encouraged the spirit of inquiry and experiment and—through its examinations—established high standards of competence.

The standing of mining electrical and mechanical engineers in the industry was higher now than ever before, Sir James said, and the association could justifiably take a large share of the credit for that improvement in status.

The Annual Dinner

Proposing the toast of "The Association of Mining Electrical and Mechanical Engineers" at the annual banquet on Friday evening, Mr. Richard Wood, Minister of Power, said that the founders of the association saw the needs of the future some 50 years ago, and he was glad of the opportunity of acknowledging the part mechanical and electrical engineers had played in the development of the industry.

Welcoming the presence of Sir Joseph Latham at the dinner, Mr. Wood expressed his great regret at Sir Joseph's decision to give up the post of deputy chairman of the National Coal Board. His work on behalf of the industry and of the country at large had been of the utmost value, and, as everyone knew, Sir Joseph had not spared himself in carrying it out. Referring to the impending retirement of Sir James Bowman also, Mr. Wood said that it was with immense regret that he received these two resignations. In the circumstances he counted himself fortunate in having secured the services of Mr. Alfred Robens and Mr. E. H. Browne to carry on the work of Sir James and Sir Joseph on the National Coal Board.

In his reply to the toast, Mr. A. E. Crook said that the big contribution made by electrical and mechanical engineering towards the great increases

in efficiency and safety in the coal-mining industry during the last 50 years was the underlying theme of the golden jubilee convention, and the members of the association were gratified at the acknowledgment of that important contribution which had been made both by the Minister of Power and by the chairman of the National Coal Board. He believed that AMEME members could make an even greater contribution in the future; indeed, that they should do so was absolutely essential to the degrees of productivity, safety, and efficiency on which the competitive power of the industry was dependent.

But, said the president, these objects could not be achieved at the requisite rate unless the status of the engineering personnel from the bottom to the top of the industry was sufficiently high to attract and retain the necessary number of engineers, technicians, and craftsmen. That seemed to be a matter of paramount importance having regard to the increasing demands of other industries for these highly qualified men and to the urgent need to decrease the ratio of non-technical workers to the technical workers in the industry.

The toast to the guests was proposed by Mr. E. Loynes, immediate past president of the association, responses being made by the deputy Mayor of Blackpool and by Mr. G. M. Harvey.

There are 11 founders still on the AMEME membership roll, and Mr. Harvey spoke on their behalf as one of three founder members present at the dinner. On the occasion of this 50th convention he asked the company to stand for a moment in tribute to the memory of the late Mr. William Maurice, whom he described as the real founder of the association. He welcomed the presence that evening of Mr. Maurice's daughter, Miss H. M. Maurice, "the only lady member of the AMEME and a mining electrical engineer in her own right."

The evening ended with a vote of thanks to the president—"our Albert"—proposed by Mr. B. L. Metcalf and heartily accorded.

New Literature

NEW catalogues, booklets, and other publications which have recently been received include those mentioned below.

INCANDESCENT HEAT COMPANY, LIMITED, Smethwick—Details of "Jetube" fusing furnaces are contained in a new brochure (V.60).

GEORGE KENT, LIMITED, Luton (Beds)—Publications dealing with orifice fittings (No. 281) and the JSM domestic water meter (No. 109) are now available.

FODENS, LIMITED, Elworth Works, Sandbach—Foden News, published monthly, is an attractive magazine containing details of the company's products at work in many parts of the world.

THOMPSON L'HOSPIED & COMPANY, LIMITED, Amblecote, Stourbridge—Leaflet No. V.41B is entitled "Cast Nickel Chromium Circular Carburizing Pots and Cast Nickel Chromium Rectangular Carburizing Boxes."

RANSOMES & RAPIER, LIMITED, Waterside Works, Ipswich—Many advantages are claimed for the new RapieR 1520 mobile crane. They are listed, together with much other information, in publication No. 1/532.

STURTEVANT ENGINEERING COMPANY, LIMITED, Southern House, Cannon Street, London, E.C.4—Electrostatic precipitation is the subject of publication No. 7020, which supersedes an earlier brochure on the subject.

HONEYWELL CONTROLS, LIMITED, Ruislip Road East, Greenford (Middx)—"You and Honeywell" is the title of a new booklet sent to all employees of the company. It will, however, appeal also to a much wider field of circulation.

EDGAR ALLEN & COMPANY, LIMITED, Imperial Steel Works, Sheffield 9—Articles on "The Metal-arc Welding of Stainless Steels" and "The Heat Treatment of Steel" are among the contents of the June issue of the Edgar Allen News.

CRAVEN BROS. (MANCHESTER), LIMITED, Vauxhall Works, Reddish, Stockport—A heavy general purpose lathe built for use in the roll and die shop of the new steelworks at Durgapur, India, is among the company's products described in the May-June issue of the Craven Machine Tool Gazette.

BAIRD & TATLOCK (LONDON), LIMITED, Freshwater Road, Chadwell Heath (Essex)—The May issue of the company's news letter is devoted to the firm's exhibits at the recent International Exhibition of Instruments, Electronics, and Automation held in London.

ELLIOTT-AUTOMATION, LIMITED, 34, Portland Place, London, W.1—A series of six talks broadcast in the External Service of the BBC on the subject of "The A.B.C. of 'Electronic Brains'" has been published in booklet form. The talks were given by Mr. Leon Bagrit, the company's deputy chairman and managing director.

MOND NICKEL COMPANY, LIMITED, Thames House, Millbank, London, S.W.1—The latest edition of the Inco-Mond Magazine features an article on fertilizer production, illustrating how nickel containing 18/8 stainless steel, due to its corrosion-resistant qualities, proves to be ideal for many of the major components in the manufacturing process.

BUREAU VOOR HANDELSINLICHTINGEN, Amsterdam C., 16, Oudebrugsteeg—The 1960 edition of the annual "Buvoha Trade Letter" contains a large number of addresses of industrial and commercial firms in the Netherlands interested in trade relations with firms abroad. A free copy is available to firms in the UK interested in business relations with Dutch companies.

BELMOS COMPANY, LIMITED, Bellshill (Lanarkshire)—Considerable attention has been directed in recent years to the problem of short-circuit values, which, under various conditions, can occur at a modern low-voltage group motor control board comprising large banks of motor starters and associated apparatus. Because it feels that some of the thought directed to the problem has become confused, the company has produced a useful leaflet (PA 88:10) in an endeavour to set out the various fault conditions which can arise, to show that guessing the fault value may lead to unnecessarily costly equipment, and that factors other than the impedance of the power transformer has an important bearing on the problem.

Pig-iron and Steel Production

STATISTICAL SUMMARY

IN the following United Kingdom pig-iron and steel statistics, issued jointly by the Iron and Steel Board and the British Iron and Steel Federation, Table 1 gives the production of pig-iron and ferro-alloys and the number of furnaces in blast in April. Table 2 gives the production of steel ingots and castings in April and Table 3 gives details of deliveries of finished steel in March last. Activities of the industry are summarized in Table 4.

TABLE 1.—*Average Weekly Production of Pig-iron and Ferro-alloys in April,* 1960. (*Thousands of Tons.*)

District.	Furnaces in blast.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derbys, Leics, Notts, Northants, and Essex	21	—	30.7	22.0	0.1	—	52.8
Lancashire (excl. N.-W. Coast), Denbigh, Flints, and Cheshire	8	—	22.6	—	—	1.8	24.4
Yorkshire (excl. N.-E. Coast and Sheffield)	—	—	—	—	—	—	—
Lincolnshire	8	—	44.8	—	—	—	44.8
North-East Coast	17	2.1	59.8	—	—	1.4	63.3
Scotland	7	1.6	22.9	1.3	—	—	25.8
Staffs, Shrops, Worcs, and Warwicks	4	—	7.6	1.0	—	—	8.6
South Wales and Monmouthshire	11	2.5	60.7	1.5	—	—	64.7
Sheffield	2	—	3.4	—	—	—	3.4
North-West Coast	8	20.2	—	2.1	—	0.5	22.8
Total	86	26.4	252.5	27.9	0.1	3.7	310.6
March, 1960*	87	26.0	257.2	24.9	0.1	4.1	312.3
April, 1959	79	20.4	189.3	18.5	0.2	2.9	231.3

TABLE 3.—*Average Weekly Deliveries of New Non-alloy and Alloy Finished Steel.* (*Thousands of Tons.*)

Product.	1958.	1959.	1959. March.*	1960. Feb.	1960. March.*
Non-alloy steel:					
Ingots, blooms, billets, and slabs‡	4.6	5.1	4.1	5.3	5.5
Heavy rails	10.2	6.8	7.3	8.8	10.0
Sleepers	1.2	0.6	0.7	0.3	0.5
Fishplates and soleplates	0.7	0.4	0.3	0.6	0.6
Plates:					
(i) Over ⅜ in.	29.6	24.8	25.1	31.4	31.3
(ii) Under ⅜ in.	17.7	18.3	17.2	22.3	23.2
Other heavy prod.	41.8	41.2	35.5	56.0	55.7
Ferro-concrete bars	7.6	9.6	7.8	13.4	12.7
Wire rods	21.5	23.5	21.1	28.9	29.9
Arches, etc.	8.6	7.8	8.7	8.5	8.5
Other light sections	29.1	33.0	28.5	44.5	45.5
Bright steel bars	6.2	7.6	6.3	10.4	10.3
Hot-rolled strip	22.6	27.4	26.7	36.2	35.3
Cold-rolled strip	7.0	8.0	7.0	10.6	10.7
Sheets, incl. uncoated:					
(i) Hot rolled	10.6	11.8	10.9	14.2	13.9
(ii) Cold reduced	31.1	35.2	33.3	41.3	43.5
Tinplate:					
(i) Hot dipped	8.4	7.7	6.4	10.2	9.1
(ii) Electrolytic	10.3	13.2	12.5	15.9	15.6
Blackplate	0.8	0.7	0.7	0.9	1.0
Steel tubes up to 16 in.	19.0	20.6	18.4	25.0	24.4
Tube fittings, etc.	0.4	0.4	0.4	0.4	0.4
Tyres, wheels, and axles	4.5	2.4	3.0	2.2	2.8
Forgings (excl. drop)	2.6	2.1	2.0	2.2	2.2
Steel castings	4.2	3.6	3.7	4.5	4.3
Tool steel	0.2	0.2	0.2	0.2	0.2
Total	300.5	312.0	287.8	394.2	397.1
Alloy Steel	16.1	18.2	17.0	23.8	23.1
Total deliveries from UK production†	316.6	330.2	304.8	418.0	420.2
Add: Imported finished steel	7.0	7.1	6.3	15.6	15.2
	323.6	337.3	311.1	433.6	435.4
Deduct: Intra-industry conversion§	41.2	47.6	46.0	60.1	60.6
Total new material	282.4	289.7	265.1	373.5	374.8

† Includes finished steel produced in the UK from imported ingots and semis.
‡ Other than for conversion into any other form of steel listed.
§ Material for conversion into other products also listed in this table.

TABLE 2.—*Average Weekly Production of Steel Ingots and Castings in April,* 1960. (*Thousands of Tons.*)

District.	Open-hearth. Acid.	Open-hearth. Basic.	Bessemer.	Electric.	All other.	Total. Ingots.	Total. Castings.	Total ingots and castings.
Derbys, Leics, Notts, Northants, and Essex	—	4.6	16.6 (basic)	2.5	0.1	22.4	1.4	23.8
Lancs, (excl. N.-W. Coast), Denbigh, Flints, and Cheshire	0.7	40.6	—	5.2	0.3	45.6	1.2	46.8
Yorkshire (excl. N.-E. Coast and Sheffield)								
Lincolnshire	—	50.3	—	—	0.1	50.3	0.1	50.4
North-East Coast	0.7	90.3	—	1.3	0.4	91.0	1.7	92.7
Scotland	0.8	50.0	—	3.8	—	52.6	2.0	54.6
Staffs, Shrops, Worcs, and Warwicks	—	25.9	—	4.2	0.7	29.0	1.8	30.8
S. Wales and Monmouthshire	2.3	93.7	15.8 (basic)	0.8	0.1	112.3	0.4	112.7
Sheffield (incl. small tonnage in Manchester)	6.9	39.5	—	13.5	0.3	58.3	1.9	60.2
North-West Coast	—	—	5.3 (acid)	0.8	—	6.0	0.1	6.1
Total	11.4	394.9	37.7	32.1	2.0	467.5	10.6	478.1
March, 1960*	13.8	394.6	39.3	35.1	2.3	473.3	11.8	485.1
April, 1959	11.5	322.2	25.3	26.2	2.1	377.4	9.9	387.3

TABLE 4.—*Iron and Steel Price Index and General Summary of Pig-iron and Steel Production.* (*Weekly Average in Thousands of Tons.*)

Period.	B.o.T. Price Index, 1938 = 100. Iron and steel.	Coal.	Basic materials.§	Iron-ore output.	Imported ore used.	Coke sent to blast furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy). Imports.†	Prod. ingots, castings.	Delivrs. finished steel.	Stocks.‡
1957	328	488	537	325	303	270	275	220	14	417	322	2,580
1958	343	403	478	276	262	227	245	196	9	369	284	2,242
1959	340	497	477	286	244	210	242	208	7	388	291	2,244
1960—Feb.	338	503	486	333	320	256	302	250	15	482	375	2,267
Mch.*	337	502	487	347	325	262	312	256	19	485	376	2,243
Apl.	337	502	490	326	329	265	311	251	23	478	370	2,289

* Months contain five weeks, all tables.
† Weekly average of calendar month.
‡ Stocks, ingots, semi-finished and finished steel, at the end of the years and months shown.
§ Used in non-food manufacturing industries.

BISRA Steelmaking Conference

ALL-BASIC OPEN-HEARTH FURNACES

The second session of the recent 54th Steelmaking Conference of the British Iron and Steel Research Association, held at Harrogate, was devoted to the "Properties of Basic Roof Bricks." A report, exclusive to IRON AND COAL, *is given below of the first of the papers presented at this session.*

BASIC BRICKS FOR OPEN-HEARTH FURNACE ROOFS

By H. M. RICHARDSON

A NUMBER of types of basic brick are now available for use in open-hearth furnace roofs. These include fired and unfired shapes of both magnesite-chrome and chrome-magnesite and also unfired or chemically bonded magnesite bricks as have been used on continental plants. The properties of the basic bricks are determined by the chemical and physical nature of the available raw materials and by the methods used during manufacture. The development of basic roof bricks has followed the results of research work and the changing ideas on the properties that are desirable.

Properties of Silica and Basic Bricks

Probably the main advantage of the use of basic over silica brick is the higher refractoriness or melting point of the basic brick. Samples of basic brick have been heated to temperatures approaching 2,000 deg. C. before a marked change in shape of the specimen occurred, whereas, the melting point of silica is 1,728 deg. C.

Some properties of super duty silica and chrome-magnesite bricks are listed in Table 1.

TABLE 1.—*Physical Properties of Super Duty Silica and Basic Bricks.*

Property.	Silica.	Chrome-Magnesite.
Bulk density, g/cc.	1.93	2.98–3.15
True specific gravity ..	2.33	3.88–3.94
Refractoriness-under-load: Rising temp. test.. ..	1,700 deg. C.	1,750 deg. C. plus
Maintained test, 1 hr. at 1,600 deg. C.	No deformation	*c.* 2.0 per cent. deformation
Cold crushing strength, lb./sq.in.	3,750	2,000–5,000

It will be noted that the basic is much heavier than the silica brick and that the silica brick can withstand a maintained load at temperatures approaching its melting point, but the basic brick will creep when under load at relatively low temperatures. It was therefore considered essential at one time that a basic roof should be suspended.

At working temperatures the hot face of a silica roof is fluid, but steel plates are used between the more refractory basic bricks so that the individual bricks will be welded together by the reaction between plate and brick to produce a stronger structure. The deformable steel plates may also serve as expansion joints.

A silica brick shows high expansion and spalling tendencies at temperatures below 600 deg. C., but very low expansion at high temperatures, while basic brick gives a more or less straight line expansion curve to high temperatures. The higher percentage expansion at temperatures above 1,000 deg. C. contribute to the greater spalling tendency of the basic, especially magnesite brick, in this temperature range. Differences in thermal conductivity are also quite marked, silica has the lower co-efficient at temperatures below 600 deg. C., but this rises with increase in temperature and at temperatures above 1,000 deg. C. the basic brick has the lower thermal conductivity.

The behaviour of the acid silica brick towards basic and iron bearing slags is quite different from that of the basic bricks and, of course, basic roofs can and should be used at higher temperatures than the silica roof.

Composition and Constitution of Basic Bricks

A chrome-magnesite or a magnesite-chrome brick, as the name suggests, is made from a mixture of chrome ore and dead-burnt magnesite and the relative amounts of these two constituents coupled with the magnesia content of the particular ore used determines the type. According to the Magnesite and Chrome Brick Manufacturers' Association, the demarkation line is 55 per cent. magnesia as determined by chemical analysis. The major crystalline phases present in both types of brick are magnesia, a spinel solid solution (chrome grain), and silicates (magnesium, and magnesium lime silicates) and, therefore, the properties of the two types are often very similar.

The load-bearing capacity of the bricks at high

TABLE 2.

Brick No.	Per cent. wt. of Monticellite ($MgO.CaO.SiO_2$) in brick.	R-U-L 28 lb./sq. in.
88	1.6	1,760
94	5.6	1,720
85	6.3	1,660
91	6.8	1,640
93	7.2	1,610
90	8.6	1,590
89	10.3	1,560

5.6 per cent. monticellite corresponds to 2 per cent. lime (CaO) in the brick.

temperatures is very dependent on the percentage lime and silica content. This has been illustrated by use of the refractoriness-under-load test and the data shown in Table 2 is taken from " Basic Refractories " by J. R. Rait.

Typical analyses of basic bricks that were used in the years 1954-57 are given in Table 3.

TABLE 3.—*Chemical Analyses of Basic Bricks.*

Brick.	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Cr_2O_3	Loss on ignition
1	3.78	14.06	11.63	0.89	50.63	18.52	0.27
2	3.65	10.07	12.47	1.12	47.90	23.75	0.14
3	4.93	11.76	10.51	1.47	44.90	26.17	0.06
4	3.89	9.97	5.75	2.05	63.41	14.55	0.38
5	5.04	13.22	11.86	1.84	39.02	28.34	0.10
6	3.64	13.26	9.41	1.20	50.88	21.27	0.20

Brick 4 is a magnesite-chrome brick, the others being called chrome-magnesite. The lime content is controlled by the amount present in the magnesite, but the silica content is largely dependent on the silica content of the chrome ore which is a notoriously variable raw material even when obtained from one country or deposit.

Studies of the behaviour of basic materials towards iron oxides had an important effect on the development of basic bricks. The work of Bowen and Schairer on the binary phase system MgO-FeO indicated that magnesia could absorb large amounts (50 per cent.) of ferrous oxide before liquid would be formed at steelmaking temperatures, but it was found that the absorption of magnetite (Fe_3O_4) by the chrome grains was accompanied by a marked expansion effect, this latter reaction being known as the iron oxide bursting expansion. At temperatures above 1,600 deg. C., magnetite in contact with a basic brick surface tends to cause the brick to expand or burst, but some of the iron oxide is stabilized as a ferrous oxide-magnesia solid solution in the magnesia fraction with no serious ill effects.

It was also found that coarse chrome grains gave a lower bursting expansion than fine ores and that certain coarse chrome grains that contained cracks or fissures behaved like fine grains in the iron oxide bursting test. Brickmakers have, therefore, tended to use chrome ore in the coarse fraction and magnesia in the fine fraction of their mixtures when making chrome-magnesite bricks of the conventional 70:30 chrome to magnesia ratio. Brickmakers would also wish to use non-fissured ores in the manufacture of roof blocks. In order to maintain the correct grading to produce bricks of reasonably low porosity, coarse magnesia has been used when the chrome to magnesia ratio is altered to produce magnesite-chrome bricks.

It would, therefore, be expected that a magnesite-chrome brick should give a lower iron oxide bursting expansion than a chrome-magnesite brick.

Since the magnesia fraction is often the major source of the lime content of the brick, and since even dead-burnt magnesia tends to show continued shrinkage on heating at 1,700 deg. C., it would also be expected that the magnesite-chrome brick should give a larger volume or linear shrinkage than the chrome-magnesite brick when the permanent linear change test is applied at 1,700 deg. C., and this is sometimes true. This effect may also be expected when it is remembered that chrome grains can be the source of expansion effects when heated to high temperatures (oxidation-reduction or new spinel solid solution formation).

Desirable Properties of Basic Roof Bricks

The All-basic Furnace sub-committee conducted a series of roof panel trials at four steel plants with the object of determining the relationship between roof life and brick quality based on laboratory tests. The results drawn from the trials were that brick quality was probably less important than the prevailing operating conditions or than roof construction. Laboratory properties of the bricks that were considered to be of importance were:— (*a*) Volume stability when reheated at 1,700 deg. C.; (*b*) good load-bearing capacity at high temperatures, *i.e.*, good behaviour in the maintained temperature (1,600 deg. C.) refractoriness-under-load test, and (*c*) relatively good spalling resistance.

Magnesite-chrome and chrome-magnesite bricks gave equal performance and there was no direct relationship between the iron oxide bursting expansion and roof life. It was also difficult to show any relationship between the spalling index based on the prism spalling test at 1,000 deg. C. and roof life, but the method of deterioration of the roof indicated that spalling resistance was an important property. In these trials roofs deteriorated by the formation of cracks parallel to the hot face and the falling away of pieces 2 to 3 in. thick from the roof surface.

The development of the basic brick has been directed on these lines, *i.e.*, the development of improved volume stability at 1,700 deg. C. and of good load-bearing capacity as measured by the refractoriness-under-load test or a high temperature torsion test. The use of chrome ore invariably in the coarse fraction only has not necessarily been the rule because bursting expansion has not been considered of such great importance.

Increased roof temperature in basic roofs have meant that increased testing temperatures should be used. Bricks or laboratory made samples after heat treatment at 1,700 deg. C. to 1,800 deg. C. have shown marked changes in brick texture. The silica content of the brick became redistributed at the high temperature and there appeared to be a closer bond between the magnesia and chrome grains. It has been shown that the reheat treatment of bricks or the increased firing temperature of

TABLE 4.

Mixture.	Firing temp.(deg. C.).	R-U-L (28 lb. per sq. in. 1,600 deg.C.)
A	1,500	5 per cent. deformation in 30 min.
A	1,700	0.6 per cent. ,, in 1 hr.
L	1,500	1 per cent. ,, in 1 hr.
L	1,600	0.4 per cent. ,, in 1 hr.

laboratory-made specimens has resulted in improved refractoriness-under-load values and, of course, greater volume stability at 1,700 deg. C. These effects are shown in Tables 4 and 5.

Table 5 also indicates that the increased firing temperature has caused a reduction in the iron oxide bursting expansion, but has tended to reduce the spalling resistance given by the prism spalling test.

TABLE 5.

Mixture.	Firing temp. (deg. C.)	App. por. (per cent.).	Burst. exp. (1,600 deg.C.)	Spalling Index.
A	1,500	18.1	9.6	30
	1,600	17.8	6.6	30
	1,700	19.3	3.9	19
K	1,500	18.4	17.1	23
	1,600	18.2	10.7	13
	1,700	15.1	6.8	11

It is possible that with the use of fine chrome ore or of other additions together with improved firing schedules, a better type of brick will result. In any case bricks of improved high temperature load-bearing and volume stability properties are now available. Typical properties of basic bricks are shown in Table 6. This table indicates that some bricks available in 1959 were improved over those of 1955 in the refractoriness-under-load test because deformations of the order of only 1-2 per cent. took place in one hour at 1,600 deg. C., whereas the older bricks deformed 5 per cent. before the test time of one hour had elapsed. Small expansions rather than shrinkages take place in the PLC test. The table also indicates that not only is the bursting expansion of the magnesite-chrome brick less than that of the 1955 chrome-magnesite bricks, but that the 1959 chrome-magnesite bricks now have low iron oxide bursting expansion characteristics. One would expect that this also is a step in the right direction and this is further illustrated in Table 7 where it will be noted

TABLE 6.

Bricks.	1955 C/M.	1955 C/M.	1959 C/M.	1959 C/M.	1955 M/C.
Porosity, per cent. ..	26.8	21.0	19.3	20.9	23.0
R-U-L	12 min.	14 min.	<1.0	1.8	40 min.
PLC, 1,700 deg. C. ..	−1.9	−1.0	+0.3	+0.3	−0.7
Burst, 1,600 deg. C. ..	8	14	3	2	1.5
Spalling	+25	+25	4	14	+25
SiO_2	6.3	5.5	2.6	3.8	4.0
CaO	0.9	1.2	1.6	1.3	2.1
Cr_2O_3	27.5	32.1	26.5	23.8	16.2

that an unfired magnesite-chrome brick also has a low index.

Table 6 also indicates that the 1959 bricks have increased spalling tendency in the 1,000 deg. C. prism spalling test.

TABLE 7.—*Iron Oxide Bursting Expansion at 1,650 deg. C.*

C/M	1955	22
C/M	1959	5
M/C	1958	4
M/C	1958	5
C/M	1957	13
Unfired M/C	1959	4

The prism spalling test at a maximum temperature of 1,000 deg. C. may not bear much relationship to the behaviour of the full sized bricks to temperature fluctuations in the furnace roof. Basic bricks have, therefore. been examined in a panel spalling test at temperatures in the range of 1,100 deg. to 1,700 deg. C. In this test a panel of eight bricks, 12 by 4½ by 3 in., can be heated to 1,700 deg. C. so that a temperature gradient exists along the 12-in. length of the bricks. The panel is the floor of a gas-fired furnace so that one end of the bricks can be heated to any temperature up to 1,700 deg. C., while the other end of the bricks rests in the metal base of the furnace. The temperature of the hot face can be cycled from 1,700 deg. C. down to 1,100 deg. C., or to a temperature between 1,700 deg. C. and 1,100 deg. C., and back again to 1,700 deg. C. Under these conditions it has been demonstrated that a crack appears in the basic brick parallel to the hot face after a very limited number of cycles. The crack may be 1 in. or 3 in. from the hot face and is very similar to the cracks that have beer. observed in used roof bricks.

It has been shown that the hot face of some bricks can be cycled from 1,700 deg. C. to 1,300 deg. C. before cracking occurs, but other bricks including fired magnesite may crack when the temperature has fluctuated only from 1,700 deg. C. to 1,600 deg. C. or when the brick has merely been heated to 1,700 deg. C. and cooled again. It has been confirmed that the 1959 bricks listed in Table 6 crack very readily in the panel spalling test.

Temperature fluctuations on the roof surface can, therefore, be very important and bricks that give good service at one plant may not prove to be so good at another.

It should be noted that the bricks have cracked in this test without the addition of iron oxide or furnace slag and without the migration of silica or lime into the brick. Used bricks removed from basic roofs always show flux migration, *i.e.*, the movement of lime and silica away from the hot face and the concentration of silicate minerals 2 or 3 in. behind the working face. This pick up of iron oxide near the brick surface and especially the flux concentration in the zone where cracks are often seen have been associated with the slabbing away of the brick surface; however, these tests show clearly that the brick may crack or spall without the aid of changes in its chemical state.

The panel spalling test has also shown that the cross-sectional area has an important effect on the resistance of a brick to thermal shock. The smaller the cross section of the brick, the greater is its resistance to crack formation. The presence of small saw cuts, 2 or 3 in. deep and perpendicular to the hot face also increased the resistance of a basic brick to the formation of cracks in this test.

Unfired Basic Bricks

Unfired bricks that contain internal steel plates as well as external steel cases have given good

service at some plants. Again chrome-magnesite and magnesite-chrome unfired bricks are available and an unfired magnesite brick has also been used with success. The steel plates not only serve to strengthen the brick in service at the weak zone that may develop where the chemical bond has been destroyed and the ceramic bond has not yet been formed but they divide the brick into smaller units. These smaller units would be expected to withstand thermal shock better than the whole brick of larger cross section. The physical state of the unfired brick may also contribute to its resistance to thermal shock. Experiments in the panel spalling test have indicated that the internally plated bricks crack less readily than the fired bricks.

The steel plates have been removed from a number of unfired bricks and specimens cut from the chemically bonded material have been heated in the temperature range 1,400 deg. to 1,700 deg. C. Linear changes and the percentage apparent porosity of the fired specimens have been determined. These results are shown in Table 8.

TABLE 8.

Unfired.	Heated for 2 hr. at deg. C.					
	1,400.		1,600.		1,700.	
	PLC.	Porosity, per cent.	PLC.	Porosity, per cent.	PLC.	Porosity, per cent.
M/C ..	−0.04	22.9	−1.28	20.7	−1.00	20.7
Mag. ..	−0.84	20.6	−1.65	17.9	−1.59	18.6
M/C ..	+0.23	19.8	−0.87	16.7	−0.13	18.4
M/C ..	−0.11	25.0	−1.00	23.3	−0.65	23.2
C/M ..	+0.27	20.7	−0.08	19.5	+0.09	20.3
M/C ..	+0.29	21.5	+0.22	21.4	+0.21	21.3

It will be noted that relatively volume stable unfired bricks can be obtained and that the material may be reasonably dense after firing for 2 hr. at 1,600 deg. or 1,700 deg. C.

The examination of used chemically bonded bricks in the laboratory has indicated that they have behaved very similarly indeed to the fired bricks. Iron oxide and flux migration has taken place and the same reaction products have been formed. Cracks parallel to the hot face do also occur. A used chemically bonded magnesite brick of very coarse grading had produced a very dense hot face that contained very large crystals of magnesia. The crystal growth and consolidation was such that the hot face zone now closely resembled a fused magnesia block.

Conclusions

It has been indicated that certain properties considered desirable in basic roof blocks can be developed in hard fired bricks. However, unfired bricks have also given good service in certain steel-plants. It would appear, therefore, that operating conditions and roof construction may determine the type of brick that is needed. A hard-fired brick of good volume stability and load-bearing capacity at high temperatures but of relatively poor spalling resistance may give good service at high temperatures when the roof temperature is maintained fairly constant but with greater fluctuations in temperature though lower average temperature this brick may give much poorer service. It is possible that an unfired brick would give longer life than the fired brick under conditions where large fluctuations in the temperature of the roof are inevitable.

BS for Industrial Protective Gloves

SEVENTEEN types of glove specified in "Specification for Industrial Protective Gloves" (BS 1651:1960) offer protection against the majority of industrial hazards to which the hands are vulnerable. Shotblasting, welding, furnace work, riveting—these are some of the operations in which the wearing of gloves to BS 1651 will protect the operator. The standard contains an extensive list of classified hazards.

Materials for the gloves fall into four groups—leather, plastics, rubber, and cotton. "Experiments," it is stated, "are being carried out with new material for gloves and glove linings made from man-made fabrics and mixtures of man-made fibre and cotton. Depending on the outcome of these experiments, an amendment to the standard may be issued later."

Of the 17 types of glove specified in the 1950 edition, one has been discarded. It has been replaced by fabric-lined rubber gloves and gauntlets. The 46 pp. publication specifies design particulars, size, and detailed dimensions. Also specified are requirements for materials and for their testing. In one test, air at a pressure of 20 lb./sq. in. is introduced into the glove; no air bubbles must be seen to escape when it is immersed in water. The construction of the protective gloves is fully dealt with, illustrations being used to amplify the text where necessary, particularly as regards the different types of glove.

Copies of this standard may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1, price 10s.

Burtonwood Engineering Expansion

TRIBUTE to the excellence of British craftsmanship was paid by Mr. Philip A. Roth, a director of U.S. Industries, Inc., when he opened a new plastics machinery bay at the Burtonwood Engineering Company, Limited, Warrington (Lancs). Burtonwood Engineering was acquired by U.S. Industries last October.

The new bay, which measures some 168 ft. by 60 ft., has been specially designed to give extra overhead clearance so that travelling cranes may handle heavy machinery with ease. Initially, the company concentrated on reconditioning motor-car engines; it now manufactures oil-well equipment, plastics machinery, and oil seals.

WORK IS in full swing on the construction of a second blooming mill at the Kuznetsk iron and steel combine, Moscow News reports. The mill, made at the Urals machine-building works, will be fully automated. It will be put into operation next year.

British Iron and Steel Industry Translation Service

FOLLOWING is a list of some new translations available from the Iron and Steel Institute under its translation service scheme. Translations are all classified by numbers, and these should be quoted on application, which should be addressed to the institute at 4, Grosvenor Gardens, London, S.W.1.

1412: "Measuring the Degree of Reduction in Temper Rolling." J. BILLIGMANN, *et al.* Stahl u. Eisen, 1959, July 9, pp. 977-989. £8 10s.

1516: "Welding of Ferritic to Austenitic Steels." J. CLASS. V.G.B. Mitt., 1959, June, pp. 181-207. £9 15s.

1572: "Relationship Between the Hydrogen Contents of Slag and Metal and the Steelmaking Process." I. N. BEGLETSOV. Stal' Steelmaking Processes Supplement, 1958, pp. 285-313. £7 15s.

1599: "Report on Standardization of Methods of Testing Coke Quality." L. I. ERKIN. Koks i Khim., 1958 (8), pp. 58-60. £3 10s.

1659: "Oxidation of Heat-resistant Steels: Effect of Alkaline Sulphate Deposits at the Simultaneous Presence of Traces of Sulphur Trioxide in Furnace Gases." A. RAHMEL. Arch. Eisenhüt., 1960, Jan., pp. 59-65. £4 5s.

1666: "Some Problems in the Manufacture of Seamless Stainless Steel Tubing by the Mannesmann Plug Mill Process." S. NAKAJIMA. Tetsu to Hagané, 1957, June, pp. 663-668. £6 5s.

1679: "Suitability of Blast-furnace Slag as Bituminous Aggregate for Road Building" (with discussion). A. SEND, *et al.* Stahl u. Eisen, 1960, March 3, pp. 290-296. £5.

1695: "Generation of Gases for the Reduction of Iron Ores." H.-W. GRATKOWSKI. Stahl u. Eisen, 1960, March 31, pp. 397-407. £6 5s.

1702: "Progress in the Application of Oxygen in the Open-hearth Furnace." M. FORESI and G. MASSOBRIO. Met. Ital., 1959, July, pp. 257-73. £9 15s.

1705: "Production, Properties, and Economic Importance of Rimming Open-hearth Steel." P. NETTER. Neue Hütte, 1960, Feb., pp. 63-69. £5 5s.

1706: "Potentiostatic Isolation of Structural Components in Nickel Alloys." C. ILSCHNER-GENSCH. Arch. Eisenhüt., 1960, Feb., pp. 97-102. £4 5s.

1712: "Contribution to the Problem of Carbide Banding in Anti-friction Bearing Steel." H. J. ECKSTEIN. Neue Hütte, 1959, May, pp. 304-311. £4.

1714: "Heat Transfer from the Wall to a Turbulent Flow of Air Inside a Tube with Large Temperature Differences and a Method for Calculating Wall Temperature." D. V. DYADYAKIN and V. L. LEL'CHUK. Teploenergetica, 1958 (9), pp. 74-79. £4 5s.

1725: "Requirements of Building Industry." H. RIESS. Hutnik (Warsaw), 1951 (6), pp. 234-235. £2 5s.

1741: "The Effect of Oxygen on the Quality of Rimming Steels." I. PROCHAZKOVA. Hutnik (Prague), 1958 (2), pp. 51-53. £3 5s.

1492: "The Effect of Pre-treatment of the Charge in Blast-furnace Operation." H. KAHLHÖFER, *et al.* Stahl u. Eisen, 1959, Oct. 15, pp. 1461-1471. £7.

1544: "Research into the Formation and Elimination of Deoxidation Products." E. PLÖCKINGER and M. WAHLSTER. Stahl u. Eisen, 1960, May 12, pp. 659-669. £7.

1546: "The Completion of Basic-Bessemer Conversion." J. MAROT and J. HARVENG. Rev. Mét., 1959, Oct., pp. 211-220. £4 15s.

1566: "Ultrasonic Determination of the Size of Defects." J. KRAUTKRAMER. Arch. Eisenhüt., 1959, Nov., pp. 693-703. £7 15s.

1585: "Weldability of 13 per Cent. Cr Steels Used for Castings." V. PILOUS and F. JANDOS. Slevarenstvi, 1959, May, pp. 191-194. £4 15s.

1596: "Isolation and Determination of Oxide Inclusions in High-chromium Steels and Experimental Isolation of Oxides in 18/8 Steels." E. PIPER, *et al.* Radex Rund., 1957, Mar., pp. 776-778. £3 15s.

1602: "Isothermal Transformation Diagrams for Four Swedish Standardized Spring Steels." G. MOLINDER. Jernkont. Tekn. Råd., 1958 (248), pp. 155-164. £2 5s.

1603: "Isothermal Transformation Diagrams for Some Swedish Standardized Tempering Steels." G. MOLINDER. Jernkont. Tekn. Råd., 1959 (255), pp. 405-430. £4 5s.

1619: "Modern Forging Manipulators." G. PAPULI. La Metallurgia Italiana, 1959 (3), pp. 94-100. £5.

1652: "Electronic Crane Weighing Scales for Use in Iron and Steel Works." H. KNÜPPEL and G. WIETHOFF. Stahl u. Eisen, 1960, vol. 80, Feb. 18, pp. 220-233. £9 5s.

1653: "The New 1,400-h.p. Diesel-electric Locomotives of the Types 040 DG Constructed for the French National Railways (SNCF)." D. CAIRE. Rev. Ass. Française des Amis des Chem. de Fer, 1959, Nov./Dec., pp. 164-6. £2 5s.

1654: "The Why's and Wherefore's of Track." B. PORCHER. Rev. Ass. Française des Amis des Chem. de Fer.. 1959, Nov./Dec., pp. 176-86. £7 10s.

1665: "Study on the Hot-workability of Steels. V—Hot-working Properties of Austenitic Stainless Steels." T. MORISHIMA. Tetsu to Hagane, 1956, Sept., pp. 928-930. £8 5s.

1668: "The Effect of the Method of Deoxidation on the Nature of the Non-metallic Inclusions and Mechanical Properties of Steel." M. MANDL, *et al.* Hutnické Listy (Prague), 1960 (2), pp. 109-119. £10.

1690: "Tasks and Organization of a Quality Control Department in an Iron and Steel Works and its Importance to the Operation." H. FRÖBER. Stahl u. Eisen, 1959, Oct. 29, pp. 1627-1637. £7 10s.

1694: "From Cellulose to Anthracite. IX—Experimental Contribution: Thermal Hydrolysis of Cellulose." A. GILLET and P. COLSON. Brennstoff-Chemie, 1958. Feb., pp. S17-S19. £1 15s.

1707: "Investigations on Cement and Concrete with Exo-electrons After Exposure to X-rays." J. KRAMER. Zement-Kalk-Gips, 1960 (3), pp. 11-118. £5 5s.

1715: "Determination of Tin and Antimony in Steel." L. BRHACEK. Hutnické Listy (Prague), 1957 (2), pp. 140-141. £2 15s.

Automatic Teaching Machine

AN automatic teaching machine which can instruct anyone on virtually any subject, ranging from bridge or golf to complex electronic problems or abstruse mathematical formulæ, has recently been introduced in the UK. Named the Auto-Tutor, the machine has been developed in the US by U.S. Industries, Inc. It is claimed to be the first machine to achieve the teaching function through integrated student participation.

Initially, it is expected that its most useful role will be in large industrial and military training programmes, and it is likely that the machine will be manufactured in the UK.

The Scrap Markets

European Demand Remains High

HIGH level of demand for scrap is not peculiar to this country. Delegates at the scrap-iron and steel section of the recent annual congress in London of the Bureau International de la Récuperation reported that for most qualities, demand is high all over Europe. However, it was the section's opinion that the requirements of the consuming mills can be satisfied in future on the European markets.

It has been noticed that in all countries scrap has been subjected to increased competition owing to the fact that other raw materials have been preferred and because the ratio per thousand in steel production has been lowered. In order to oppose this trend it was deemed necessary to pay particular attention to improving the quality of scrap.

Cleveland—A statement issued by the National Federation of Scrap Iron, Steel & Metal Merchants reveals that stocks of scrap held the steel industry at the end of 1959, had been raised to a high level but by the end of May these had been reduced by about 100,000 tons.

Although supplies from home sources have continued at an exceptionally high rate, special measures have been taken to provide for the needs of a still expanding steel industry.

Accordingly, an arrangement has been concluded to safeguard supplies of scrap next year, which provides for limited imports which it is affirmed will not affect normal home supplies of steel-raising scrap from the merchants.

Scotland—In Glasgow and the west of Scotland the turnover in the iron and steel scrap market has been fairly well maintained. The average daily rate of deliveries to the steelworks is fairly satisfactory although consumers would welcome even larger supplies. Steel turnings continue to be produced in sufficient quantities and deliveries to the various consuming works have been well up to average. The output of cast-iron borings also remains steady and supplies as produced are going forward to the blast furnaces.

The one disappointment in the trade is in the cast-iron foundry section. There is still no sign of any increase in the demand for cast-iron scrap, but, despite the difficulties, merchants have been fairly successful in disposing of collections of most grades of scrap cast iron. In a number of cases it has been necessary to divert cast-iron supplies to the steelworks, although this means a corresponding reduction in price.

Lancashire—Up to the present the demand for iron and steel scrap materials on the Lancashire markets has not been greatly affected by holiday stoppages at the consuming end. The engineering and other foundries in the area are taking up a fairly substantial aggregate tonnage, mainly to meet current requirements, though partly to build up stocks.

Most descriptions of steel-melting scrap are meeting with a steady demand. Fairly satisfactory supplies of cast and other varieties of scrap are available on the local markets.

VERDICT OF Death by Misadventure was returned on Mr. Raymond Lashmar (34), an excavator driver who was fatally burned when his machine was partially covered by hot shale at the tip at Old Roundwood Colliery, Ossett, on June 9.

Steel Orders in ECSC Continue to Climb

BOOM in the demand for steel within the European Coal and Steel Community shows no signs of flagging. During May a slight decline in orders from non-member countries was more than offset by increased orders from within the Community. Orders for rolled steel products reached 4,584,000 metric tons during the month, which is a slight rise on the April figure of 4,574,000 tons and substantially above the 4,104,000 tons for May of last year.

Deliveries are running more or less concurrent to the new orders and order-books in March—the latest month for which statistics are available—tended to remain unchanged. By the end of March they stood at 13,427,000 metric tons, a slight drop on the February figure of 4,574,000 tons and substantially above the but considerably more than the 9,518,000 tons on the books at the end of March, 1959.

No Big Loss on Hunterston—Simon-Carves' Chairman

CHAIRMAN of Simon-Carves, Limited, Mr. R. B. Potter, told shareholders at the annual meeting last Friday that, at this stage and speaking for the company only, there was no evidence that substantial losses would be incurred on the Hunterston nuclear power station contract. He mentioned the matter in view of recent statements in the Press on the subject of losses incurred by various groups on nuclear power station work. Mr. Potter said he wished to correct the implication of one such reference that the GEC-Simon-Carves group would incur a loss of over £2,000,000 on the Hunterston project. The research and development expenses on nuclear power plant had been paid for by the substantial sums which had been written off in previous years.

Resolutions for the merger of the company with Henry Simon (Holdings), Limited, were approved.

Optimistic Outlook for F. H. Lloyd

IMPROVEMENT in trading towards the end of the financial year ended April, 1959, continued in the past year and is reflected in the better results, state the directors of F. H. Lloyd & Company, Limited, steel founders and engineers of Wednesbury (Staffs). There is increasingly keen competition from both British and foreign producers, but the volume of business is being maintained and future results should continue to improve.

The provisional group net profit of £401,400 compares with £345,149, after UK tax (less £34,378 (nil) relief) of £281,339 (£302,779). The annual dividend of 10 per cent. makes 12½ per cent. for the year on a capital increased by a one-for-five scrip issue, an effective increase of $2\frac{1}{12}$ per cent.

INCREASE IN COAL STOCKS in the European Coal and Steel Community has reached alarming proportions despite a continuous drop in coal production, according to a report published in The Hague on Monday by M. Antoine Bertrand, a Belgian MP.

IRON AND STEEL TRADE

LESS than three months ago the revision of maximum prices of steel products was announced. The changes were not general and were designed to cover variations in the ascertained cost of production. There is, however, a striking similarity in the published financial returns of the leading companies made public in the last few weeks. All reveal increased earnings for the past year and it is persistently rumoured that a general cut in prices is under consideration. The argument put forward is that cheaper steel would discourage stockpiling, one of the contributory causes of the present shortage. It would, of course, greatly help British industry.

Pig-iron

The steel industry is looking far ahead. Its expansion plans embrace big increases in the provision of more pig-iron and scrap. Singularly, no more blast furnaces have been started since last month, but production has risen and continues to rise.

Embodied in an official statement just issued is the news that arrangements have also been made to increase the imports of scrap, stocks of which have been reduced by 100,000 tons in the first five months of this year. Merchants have been given the assurance that the decision to import more scrap will not adversely affect the home market.

Ferro-alloys

Interest in ferro-tungsten has returned to a steady level and ferro-vanadium is in reasonable request. There is a fair demand for ferro-molybdenum. The major grades of ferro-silicon are active, and ferro-chrome is receiving steady attention. There continues to be a more specialized demand for supplies of ferro-phosphorus and ferro-sulphide. There is a fair request for calcium silicide.

Ferro-niobium is receiving moderate support and ferro-titanium remains of interest. Silicon metal is moving slightly and the call on chromium metal is reasonable.

Semi-finished Steel

Use of maximum tonnages of semi-finished steel products is assured for some months ahead. Shortage of supplies is a common complaint, but never more so than at the present when so little material is available from foreign sources.

Billets, blooms, and slabs are all urgently wanted. Labour is also scarce and re-rollers are glad to recruit additional workers.

Finished Steel

Stocktaking statistics completed at the end of March disclose a considerable drop in the tonnages of plates held by consumers and merchants. A reduction of 375,000 tons in two years indicates the liberal extent of withdrawals from their own stockpiles.

The leeway in steel sheet supplies has been very largely made good, but there appears to be a growing tendency to import sheets from the US where they are in plentiful supply. The heavy beams and joists turned out at Lackenby command a brisk sale in Canada and other oversea markets.

SALES of the Swedish iron and steel group, Sandvikens Jernverks Aktiebolag, last year amounted to 276,100,000 kr. for a volume of 77,817 tons. The group net profit was 6,832,050 kr.

New Posts Announced by Appleby-Frodingham

NEW appointments are to be made from July 1 by the Appleby-Frodingham Steel Company, branch of the United Steel Companies, Limited, in view of current developments in the company's rolling mills and the plan for installing a rod/bar mill.

Mr. R. Wogin, at present manager of the Appleby melting shop, will become assistant works manager (steel). In this position he will have both general and specific duties delegated to him by Mr. W. Jackson, works manager (steel). Mr. R. Johnson is appointed melting shops manager, responsible for both the Appleby and Frodingham melting shops, together with the basic slag plant and the refractories section. Mr. A. F. Jessop is appointed manager of the Appleby melting shop, and Mr. W. L. Willsher becomes manager of the Frodingham melting shop.

Anglo-US Partnership Buys S. G. Brown

THE Admiralty is to sell S. G. Brown, Limited, precision engineers, of Watford, to de Haviland Holdings, Limited, "who, for this purpose, are associated with American Bosch Arma Corporation." De Haviland Holdings, a subsidiary of the Hawker Siddeley Group, Limited, will retain a controlling interest in S. G. Brown, which will continue to operate as a British company.

Special arrangements have been agreed with the new owners to safeguard the continuance of British control. In the House of Commons on Wednesday the Government gave assurances of continued British control over the company, and, when pressed, agreed to disclose the purchase price after the parties concerned had been approached.

British Blast Furnaces in the March Quarter, 1960

UNDER the heading of "British Blast Furnaces in the March Quarter, 1960," on pp. 1388 and 1389 of last week's issue, the figures were inadvertently given as returns for the fourth quarter, 1959.

The column headings should have indicated the first quarter, 1960, the tables having been correctly adjusted in accordance with the latest figures published by the British Iron and Steel Federation.

Coalfield News

Record Coal Shipment from Immingham

LOADING began on Monday at Immingham of what is claimed to be the largest cargo of coal ever exported from the Humber. A shipment of 18,500 tons of washed smalls from the East Midlands Division of the National Coal Board was shipped in the Norwegian ore carrier Providence, for the power stations at Asnaes and Kyndby of the Danish Isefjordvaerket Power Company.

The shipment, which is part of a contract for 60,000 tons, was loaded at the first of the new coaling stations at Immingham from radial-arm coaling appliances capable of loading 1,100 tons an hour.

RECORD PRODUCTION FIGURE was recorded at Easington Colliery (Co. Durham) last week. The output of 24,189 tons, raised and weighed, was the highest in the pit's 50-years' life.

MINERS at Gateside and Tower Collieries (Dumfriesshire) returned to work on Wednesday of last week after being on strike since the previous Sunday. The dispute cost about 1,000 tons of coal.

NORTHUMBERLAND MINERS' PICNIC is to be featured in the BBC's television programme "Monitor" on July 3. The commentator for the film of this year's picnic is Mr. John Gibson, a Bedlington miner who plays the baritone horn in the Pegswood Colliery Band.

COUNTY PRESIDENT of the Northumberland area of the National Association of Colliery Overmen, Deputies, and Shotfirers, Mr. James W. Pattison, is to be put forward for selection as prospective Labour candidate for Blyth, the seat now held by Mr. Alfred Robens who is to be chairman of the NCB.

ONE MAN WAS KILLED and two others injured in an accident at Overton Colliery (Lanarkshire) on Thursday of last week. Mr. Peter Stewart (59), a deputy, was trying to re-rail two mine-cars at the pit bottom when, during shunting operations, some stationary wagons were pushed into collision with the derailed cars and fatally crushed him.

SHORT-WAVE RADIO SETS are planned for vehicles in the Doncaster Area of the North-Eastern Divisional Coal Board, to ensure greater safety when money is being carried and to make work more economical. Over 20 vehicles will be equipped if local planning permission is given for a 97-ft. aerial on the board's Area headquarters in Doncaster.

DESPITE the installation of extensive prevention plant at coal washeries, the pollution of rivers by the NCB was as bad as ever, members of the pollution prevention committee of the South-West Wales River Board were told by the chief pollution officer, Dr. W. R. Howells, on Monday. The committee decided that unless there was a vast improvement in the position in the next three months further steps, which might lead to prosecution, would be considered.

AFTER the introduction of compulsory retirement at 65, the annual allowance of free coal for retired miners in the Cannock Chase area was reduced from 4 tons to 30 cwt. At the annual dinner for retired miners on Saturday Mr. H. Davies, Cannock Chase miners' agent, announced that the allowance is to be restored to 4 tons. Following negotiations with the NCB, it has been agreed that underground workers will forfeit 1 cwt. from each of their allowances. Surface workers would do the same, but only for half the year.

6.6 Per Cent. Less Coal This Year

OVERALL, coal production this year is 6.6 per cent. less than for the comparable period last year. To date, 94,442,000 tons of saleable coal have been produced, compared with 101,115,900 tons in the first 24 weeks of 1959. Deep-mined output is about 5 per cent. less and open-cast output 35 per cent.

Coal consumption for the week ended June 11 at 3,002,000 tons was well above the Whitsun week output figure of 2,794,400 tons, but last week production returned to normal at 3,931,900 tons. Undistributed coal stocks are now only 40,000 tons below the 34,000,000-ton mark. Distributed stocks were slightly less at 12,714,000 tons.

There were 602,400 wage-earners on colliery books on June 11, against 663,200 on June 13, 1959, the numbers engaged at the coal face being 230,300 and 257,900 respectively. Total absenteeism (all workers) in the week ended June 11 was 16.20 per cent. compared with 13.29 per cent. in the week ended June 13, 1959. Output at the face was 3.799 tons and overall 1.293 in the week ended June 11, compared with 3.752 and 1.354 tons in the week ended June 13.

The following table gives (in tons) the output of saleable mined coal by division in the week ended June 18, and the tonnage lost through all causes (holidays, disputes, and go-slows):—

Division.	Week ended June 18, 1960.		Week ended June 20, 1959.
	Total output.	Tonnage lost.	Total output.
Scottish	358,300	7,700	386,000
Northern (N & C)	251,200	—	266,200
Durham	468,800	—	490,600
North-Eastern ..	811,700	32,700	875,500
North-Western ..	272,300	2,600	296,600
East Midlands ..	845,200	45,100	883,400
West Midlands ..	279,600	5,200	318,500
South-Western ..	406,600	2,700	426,800
South-Eastern ..	32,000	—	32,300
Great Britain—			
Deep-mined coal..	3,725,700	96,600	3,975,900
Other deep-mined (including licensed mines) ..	41,000	—	56,500
Open-cast coal ..	165,200	—	234,800
TOTAL	3,931,900	96,600	4,267,200

Miners Want NCB to Deliver Concessionary Coal

AT a meeting between representatives of the East Fife Area of the Scottish Divisional Coal Board and NUM officials it was suggested that the board should take over the distribution of miners' concessionary coal. Although the considerable initial financial outlay involved in such a scheme was felt to be a major drawback, the NCB representatives promised to examine the possibilities of the idea.

Mr. Max Meharry, NUM delegate of Michael Colliery (Fife), explained: "The miners have felt for a long time that they are too much at the mercy of private contractors where prices are concerned. They resent, for instance, the fact that contractors added a shilling to their charges for delivery at the time of the Suez crisis and it has never been taken off again."

THE COAL TRADE

WITH the weather doing its best to emulate high summer on the Riviera it is small wonder that there is little movement in the coal trade. In most districts demand is almost negligible for household qualities and practically any and every order can be quickly met. Whereas the call for industrial coals remains reasonably steady orders for industrial cokes are hard to come by.

LEICESTERSHIRE

A steady trade continues in domestic coal and deliveries are rather better. Larger quantities of coal in the lower groups are reaching the depots. Best coals continue to be in good demand. A feature of the consumer trade is that orders now being placed are often for larger quantities than for some considerable time. Distributors are now able to give delivery of most grades reasonably promptly, but the best grades of domestic anthracite are inclined to be subject to some delay. This also applies to the best qualities of beans and grains, although lower qualities are being offered freely.

"Phurnacite" is readily available and good orders are being placed. The premium smokeless fuels are still being sought after; supplies of all types are plentiful. Fuel for central-heating purposes is being ordered by the larger consumers for stocking to take advantage of the summer prices, while service departments and local authorities are placing quite large orders and there is now some considerable activity by distributors engaged in this type of trade.

The industrial coal market remains reasonably firm for the time of the year and there are sufficient types of all grades available. Considerable tonnages are being taken up for stocking. Whereas at this time last year there were appreciable stocks of industrial doubles, DS nuts, and singles, supplies are now scarce.

SCOTLAND

Glasgow—Reflecting the fine weather, fuel consumption for space-heating has fallen sharply, but industrial usage has been well maintained in places. Disposals of house coal at 46,000 tons a week compare with 52,000 tons last year, but merchants are continuing to lay down stocks amounting to 102,000 tons against last year's figure of 97,000 tons. The best coals in each individual group prove the main attraction, those at the other end of the scale being less attractive. Nevertheless, the tonnage retained by the coal board is substantially less than a year ago. Output in the division is about 10 per cent. down at 360,000 tons a week.

Smaller requirements in electricity and gas curtailed consumption at these works to 47,000 and 30,000 tons a week against 57,000 and 33,000 tons respectively in 1959. Sustained activity in the steel trade is reflected in an increase in consumption of ordinary sorts from 12,000 tons to 16,000 tons and in coking grades from 18,000 tons to 35,000 tons. Engineering and other metal trades are also using more this year at 4,900 (3,400) tons a week and other industry at 49,000 tons against 48,000 tons.

Despite the fall in production, supplies in all cases are adequate. Anthracite stove nuts, which are well booked up, clear promptly, but consumers are not very anxious to seek supplies, and quite a number of merchants have a quantity at their depots. Large anthracite is surplus to immediate needs, and the usual summer tonnage has been put to stock. Low volatile duff clears well under the impetus of attractive rates in the export market. Manufactured fuels, gas coke, and hard coke are all slow to sell. A good demand for metallurgical and foundry coke is comfortably met.

Fife and Lothians—Quieter conditions rule in most sections of the trade, except on the export side where despatches are much higher than last year. Among sized sorts, pearls prove a drug on the market and have to be put to stock at pithead.

Coal Chartering

COAL markets generally are quiet and only a moderate amount of tonnage has been taken up from Hampton Roads, with main interest still being to Japanese destinations. Tonnage of about 13,000 tons for June, July, and August shipment has been taken from the Roads to Japan all at $8.40, but 13,500 tons for July 25/August 25 secured $8.50, and a 12,000 tonner to Miike for June 14/20 at $8.75, with charterers still prepared to operate for forward positions. There is no change in the situation in so far as Continental discharge is concerned and although a 13,000-tonner has been fixed from the Roads to Antwerp, Rotterdam or Amsterdam at 26s. for July 5/25 and a 10,000 tonner for June/July at 6d. extra, there is virtually no inquiry and business is always subject to stem. Some inquiry is noted to West Italy and possibly tonnage might be placed for Adriatic discharge.

Newcastle NSW/Moji-Tokyo Range paid 38s. f.i.o. for 9,500 tons June 20/30. Inquiry from the UK to the Mediterranean is limited but Wales/West Italy fixed 4,700 tons second half July at 23s. 6d., but there is literally nothing quoting down to West Africa. There is also some inquiry for tonnage to load from Poland to Continental discharge but other receivers are quiet. Durban/Matadi paid 47s. 6d. for 8,000 tons anthracite, August 1/20.

Australian Coal for Japan?

NEGOTIATIONS are expected to begin shortly for the conclusion of a 10-year contract to import large amounts of coking coal from Australia to Japan. Leaders of the Japanese steel industry said that they hoped to import 3,000,000 tons of coking coal from Australia annually after 1965, if transport and harbour facilities in Australia could be modernized for coal exports. This could be done, said the Australian Minister for Mines, Senator W. H. Spooner, if the 10-year agreement was concluded.

He also said that Japan believed that the steel mills would need about 16,000,000 tons of coking coal annually by 1965 and was counting on Australia to supply a substantial part of this because imports from the USA could not be expected to increase so rapidly.

Appointments

Yorkshire Coal Board Promotions

SINCE 1952 assistant land and minerals officer for the No. 4 (Carlton) Area of the North-Eastern Divisional Coal Board, Mr. G. F. BUCKLE has been appointed to the senior post of land and minerals officer. Before nationalization he was chief surveyor for New Monckton Collieries Company, Limited. He was appointed senior surveyor (subsidence claims), land and minerals department of the Area, and the following year to the post he has just relinquished.

Mr. G. GALLEY, 36-year-old undermanager at Glasshoughton Colliery, has been appointed manager of West Riding Colliery in the division's No. 8 (Castleford) Area and Mr. T. E. BLANKLEY as spare colliery manager in the No. 7 (Wakefield) Area. Mr. Galley has been training officer and deputy at West Riding Colliery up to his appointment as overman at Whitwood Colliery in 1954. He took up his present post in July, 1956.

Mr. H. K. DOUGLAS has been appointed an additional director of Hackbridge Holdings, Limited, Hackbridge (Surrey), in place of the late Mr. E. W. Farr.

Mr. H. E. BAKER has been appointed branch manager of the completely reorganized Scottish branch of Peerless & Ericsson, Limited, food preparing machinery manufacturers, of London, N.W.9.

Mr. JOHN E. LENNARD has been appointed general sales manager of Richard Hill, Limited, manufacturers of steel wire rods, etc., of Middlesbrough, a member of the Firth Cleveland, Limited, group of companies.

Mr. T. H. KELSEY, assistant general manager of the Witton engineering works of the General Electric Company, Limited, since 1958, has been appointed deputy general manager to Mr. J. J. Gracie, a director of the company and general manager of the Witton works.

Mr. DAVID C. HANEY, assistant managing director of International Harvester Company of Great Britain, Limited, since April, has been appointed managing director. He succeeds Mr. O. G. Voss who recently returned to the US to take up a position with the parent company.

London sales representative of the John Thompson Instrument Company, Limited, Mr. BERNARD WRIGHT, has been appointed sales manager. In 1958 he joined the company, which is the branch of the John Thompson, Limited, group responsible for instrumentation and automatic control systems for steam raising plant and industrial process plant.

July Issue of Mining Review

JULY issue of Mining Review, the NCB monthly film magazine which is shown at over 1,000 cinemas throughout the country, features miners from Bolsover Colliery (Derbyshire) enjoying a Saturday afternoon's cricket competing in the Bassetlaw League, Mr. George Hector, a retired Yorkshire miner, with some of the many models that he has made since his schooldays, and the tomato and flower growing industry in Guernsey.

One of the island's major industries, the acres of glasshouses are for the most part, heated by coal-fired boilers.

Export Quotas Raised Between UK-Russia

HIGHER quotas for the export of consumer goods, machinery and equipment were agreed at the annual review of Anglo-Soviet trade which finished in London on Monday. The consumer goods quotas for the next year were set at £4,000,000 each way, compared with £3,400,000 in the year to June 30, and the new quota for the import of Soviet machinery, equipment, and instruments into the UK was fixed at £2,500,000 against the previous total of £1,150,000. No breakdown of the type of goods covered by the new quotas has yet been fixed.

There was a divergence of views on the question of imports of Soviet oil into the UK, and it is believed that this will be discussed at further talks in the second half of 1960. "The two delegations reaffirmed the view of their governments that there was scope and desire for a further increase of trade between the two countries," said a communique.

According to the latest issue of Vneshnaya Torgovla (Foreign Trade), Soviet exports of iron ore moved up from 6,300,000 tons in 1953 to 13,400,000 tons in 1959, and rolled steel from 1,200,000 tons to 2,400,000 tons. Imports of machinery in 1959 totalled just under £500,000,000, four-fifths of it from other Communist countries. Imports in general were up about 20 per cent. on 1958, and machinery by 25 per cent.

The Rustyfa group of companies stated on Tuesday that after negotiations with the Soviet trade delegation in Britain it had concluded an addition to its contract with Techmashimport of Moscow for £1,000,000 to cover spare parts for the tyre factory being built at Dniepropetrovsk. Total orders so far received for this project amount to £16,000,000.

Ambrose Shardlow Imports Steel to Maintain Production

ALTHOUGH billet steel supplies can be obtained from domestic production they still fall short of the needs of Ambrose Shardlow & Company, Limited, crankshaft manufacturers, of Sheffield, states Mr. F. A. Perkins, the chairman. Output is being maintained by importing steel which carries a 10 per cent. import duty. He adds that indications are that the demand for crankshafts will continue at a satisfactory level for some time ahead.

Good progress is being made on the installation of the new 30-ton hammer and 3,000-ton press, which will be the largest of its kind in the country solely engaged on crankshaft production. The plant is expected to be in operation by October.

A number of countries which have traditionally imported complete vehicles are now turning to local manufacture, including the production of component parts, Mr. Perkins reports, and the company is considering a limited investment oversea. Plans for setting up a joint forging plant in India with Simpson & Company, Limited, Madras, have already been agreed. A manufacturing licence has been received from the Indian Government authorizing the project, the first in India specializing in crankshaft production.

HARDINGE MACHINE TOOLS, LIMITED, Feltham (Middx), has appointed Hodson Machine Tools, Limited, Newcastle-upon-Tyne, as local stockists for Hardinge collets, feedfingers, and guide bushes.

Company News

ALUMINIUM TIE-UP

Canadian Agreement with Enfield Rolling Mills

LINK between Aluminium, Limited, of Canada, and Enfield Rolling Mills, Limited, Brimsdown (Middx), was announced on Monday when it was stated that a new company has been formed to acquire the secondary aluminium smelter at Bradford (Yorks), at present operated by Enfield Rolling Mills (Aluminium), Limited. Other activities of ERMAL are not affected by the change. To be known as Alcan Enfield Alloys, Limited, the new company will have an issued capital of £500,000 owned equally by the two parent firms.

The new company will produce from scrap and primary aluminium a large range of foundry alloys not normally produced at the primary aluminium smelters of the Aluminum Company of Canada, the principal subsidiary of Aluminium, Limited. Alcan (UK), Limited, the fully-owned subsidiary of Aluminium, Limited, responsible for the distribution of " Alcan " primary aluminium and various other materials in the UK, will market the alloys produced by the new company.

No change is expected in the present management and personnel of the secondary smelter organization which will transfer to the new company. Managing director of Alcan Enfield Alloys will be Mr. W. W. Kee, managing director of Enfield Rolling Mills (Aluminium).

ROBERTS SPARROW & COMPANY, LIMITED—Dividend for the year ended March 31, 1960, is 22½ per cent., as forecast when the company was made public last March.

ELMORE'S METAL COMPANY, LIMITED—Dividend for 1959, on capital as reorganized in April of that year, is 8 per cent., against 6 per cent. previously. Group profit is £162,553 (£143,946).

W. H. DORMAN & COMPANY, LIMITED, manufacturing engineers, etc., of Stafford—A final dividend of 2d. per share (same) makes 4d. (2d.) for the year to March 31, 1960. Net profit is £94,985 (£37,388).

EDGE TOOL INDUSTRIES, LIMITED, Wolverhampton—The interim dividend is raised from 5 to 7½ per cent. on account of the year ending September 30, 1960. In 1958-59 the total payment was 17½ (15) per cent.

SAUNDERS VALVE COMPANY, LIMITED—A final dividend of 12½ per cent. makes 20 (17½) per cent. for the year ended March 31, 1960. Group net profit rose to £170,132 (£126,039), after tax of £181,500 (£124,000).

BANISTER, WALTON & COMPANY, LIMITED—In the year ended March 31, 1960, net profit fell from £137,859 to £69,411, after tax of £51,768 (£110,135). The final dividend of 20 per cent. maintains 25 per cent. for the year.

CRITTALL MANUFACTURING COMPANY, LIMITED—In the recent issue to ordinary stockholders of 1,500,000 ordinary 5s. shares at 10s. each, 1,431,055 shares—over 95 per cent. of the issue—were taken under provisional allotment letters.

ASSOCIATED COAL & WHARF COMPANIES, LIMITED—A final dividend of 9 per cent. makes 12 per cent. for the year to March 31, 1960 (equivalent 10⅘ per cent.). Consolidated net profit is £270,426 (£280,899, including special credit of £34,629).

HENRY HOPE & SONS, LIMITED, metal window manufacturers, of Smethwick—Group net profits for the year ended April 2, 1960, rose from £363,704 to £388,673, after tax of £445,793 (£433,000). The dividend is raised by 1½ per cent. to 12½ per cent.

CAMBRIDGE INSTRUMENT COMPANY, LIMITED—Second interim dividend of 4 per cent. makes 8 per cent., less tax, to date in respect of 1960. For the previous year four interim dividends and a final, each of 2½ per cent., made 12½ per cent., tax free.

GEORGE W. KING, LIMITED, mechanical handling engineers, etc., of Stevenage (Herts)—Net profit of £132,926 for 1959 compares with £105,346, after tax of 132,355 (£100,811). The dividend is raised to 12½ per cent. against the equivalent of 10 per cent.

JOHN BOOTH & SONS (BOLTON), LIMITED, structural engineers, bridge builders, etc.—Following a sharp setback the final dividend of 7½ per cent. makes 12½ (27½) per cent. for the year ended March 31, 1960. Trading surplus is down from £145,901 to £23,213, subject to tax of £9,054 (£71,620).

MIDLAND TAR DISTILLERS, LIMITED—Group net profit for the year ended March 31, 1960, rose from £120,021 to £206,805, after tax of £165,551 (£114,112). The dividend is raised to 12½ per cent. against 7½ per cent.—equal to 10 per cent per annum—for the previous nine months' period.

DAVID BRIDGE & COMPANY, LIMITED, specialist engineers to the rubber, plastic, and cablemaking industries, of Rochdale—Current trading continues in line with the estimate made at the last annual meeting and the interim dividend for the year ending September 30, 1960, is raised from 5 to 7½ per cent.

F. TURNBULL & COMPANY (ENGINEERS), LIMITED, mechanical handling and structural engineers, of Newcastle-upon-Tyne—Profits for the year ended March 31, 1960, fell sharply from £14,849 to £206, before tax of nil (£6,251). No dividend is recommended on the ordinary shares against 8 per cent. last year.

A. KERSHAW & SONS, LIMITED, precision engineers, etc., of Leeds—The directors state that the amount offered for the share capital by Rank Television & General Trust, Limited, reflects a fair price for the company's interests in Rank Precision Industries, Limited, and the offer is unanimously recommended.

WARD & GOLDSTONE, LIMITED, manufacturers of electrical cables, etc., of Salford (Lancs)—The ordinary dividend is raised to 35 (30) per cent. with a final of 25 (22½) per cent. The company also proposes

to make a one-for-one scrip issue. Net profit increased to £495,457 (£478,205), after tax of £419,658 (£410,945).

JAMES SCOTT & COMPANY (ELECTRICAL ENGINEERS), LIMITED, Dunfermline (Fife)—Final dividend of 20 per cent. is being paid making 25 per cent. for the year to January 31, 1960, on the capital as increased by a one-for-10 scrip issue, against a total equivalent to 21.82 per cent. Net profit increased to £126,739 (£119,791), after tax of £99,677.

E. V. INDUSTRIALS, LIMITED—Plans for raising additional permanent capital are being formulated in order to establish the financial structure, states the chairman, Mr. John Ryan. On a long-term basis it is intended to build the company into an integrated group, having a pattern of business which will enable member companies to co-operate with each other.

FERRANTI, LIMITED, electrical and general engineers, Hollinwood (Lancs)—Record outputs were achieved by the electronic computer, power transformer, and electricity meter departments in the year ended March 31, 1960, when group net profits increased from £1,104,572 to £2,123,390 after tax of £1,854,000. The dividend on the privately held £2,000,000 ordinary is again 6 per cent.

H. J. ENTHOVEN & SONS, LIMITED, lead smelters and refiners, metal merchants, etc., of London, E.C.2—The directors have been advised that the Société Minière & Métallurgique de Penarroya, and Minerais & Métaux, SA, have negotiated the sale of their entire holding of 549,795 ordinary 5s. shares to N. V. Billiton Maatschappij of The Hague, at a price stated to be 9s. 6d. a share.

BROWN & TAWSE, LIMITED, iron and steel merchants and stockholders, of Dundee—Net profit rose to £176,202 (£159,460), after tax of £163,088 (£169,113). The dividend is increased from the equivalent of 8½ per cent. to 12½ per cent. for the year ended March 31, 1960, on a capital increased by a one-for-two scrip issue. Last year a capital distribution equal to 2 per cent. was paid on the present capital.

TUBE INVESTMENTS, LIMITED—The company has acquired Loewy Engineering Company, Limited, a private concern making hydraulic machinery and rolling mill equipment, of Poole (Dorset). The terms have not been disclosed. Loewy will continue to operate as before with no change of management. Mr. K. Guttenstein, remains chairman, and Mr. E. K. L. Haffner, and Mr. M. Langen joint managing directors.

BTR INDUSTRIES, LIMITED, rubber manufacturers, belting, etc., of London, S.W.1—The improvement in the group's trading which became evident in the closing months of the last financial year has continued and trading profits for the first six months of the current year show an encouraging increase, state the directors. The interim is restored to 5 (2½) per cent. for the year to September, 1960. Last year a dividend of 12½ (15) per cent. was paid.

BELLISS & MORCOM, LIMITED, manufacturers of steam turbines and engines, etc., of Birmingham—Group loss of £144,990 was incurred in the year ended March 31, 1960, against a profit of £89,287. Following the cut in the interim from 4 to 3 per cent. no final is recommended, against 4 per cent. last year. Intake of orders has improved this year and in addition certain changes are being made in the sales organization so that the company should return to a profit-earning basis during the current half year, state the directors.

DAVY-UNITED, LIMITED, holding company of specialists in hydraulic presses, rolling mills, etc., of Sheffield—Net profit in the year ended March 31, 1960, was £1,231,020 (£886,932), after tax of £1,124,583. Special interim dividend, in lieu of a final, is 22½ per cent., as forecast last month when the merger was proposed with the Power-Gas Corporation, Limited. The dividend, on a capital doubled by a scrip issue, absorbs £416,064, against £277,375 required to pay the equivalent of 15 per cent. for the previous year.

GOODLASS WALL & LEAD INDUSTRIES, LIMITED—So far this year, states the chairman, Mr. R. L. H. Lancaster, the metal activities of the group have been running at a higher level than last year, but competition is keener than ever. Group net profit rose from £1,650,394 to £1,862,647 and the dividend is effectively increased to 19 (16) per cent. A one-for-three scrip issue is proposed and although the interim is to be maintained at 5 per cent. on the increased capital this does not indicate a higher total for the year.

SANDERSON KAYSER, LIMITED (formerly Sanderson Bros. & Newbould, Limited)—Sales during the first four months of 1960 have shown a useful advance, states the chairman, Mr. J. R. A. Bull. The present order load is substantial and export orders on hand at April 30 were more than double those at the same period last year. Although confident of a successful year, Mr. Bull does not expect the rise in profits to be at a rate comparable to the last two years. For this he blames the difficulty of increasing output due to labour shortage; the shorter working week with the resultant wage bill increase; and the effort to maintain prices in the face of increasing costs.

Profits Rise for Allied Ironfounders

NET profits of Allied Ironfounders, Limited, advanced from £720,878 to £1,355,576 in the year ended April 2, 1960, and the dividend is raised from 12½ per cent. to 20 per cent., with a final of 12½ per cent. Profit figure was reached after tax of £1,204,756, depreciation of £468,265, and crediting investment income of £82,065.

The increase, it is stated, reflects increased activity in all sections of the group's business, the elimination of the loss of £271,629 in Australia shown in the previous accounts and the inclusion of three months' additional profit from the South African subsidiary.

Last year £700,000 was provided to cover the estimated loss on realization of fixed assets of the Australian subsidiary. Of that provision £290,000 was not required and has been brought back to the credit of the appropriation account.

Rubery Owen in Joint South African Venture

AS a result of an agreement reached earlier this year between Rubery Owen & Company, Limited, structural and manufacturing engineers, of Wednesbury (Staffs), and the Vanderbijl Engineering Corporation, Limited, the state-owned South African heavy engineering works, a new factory is to be built at Port Elizabeth. It will cost £2,000,000 and will manufacture vehicle component parts. Mr. K. Wheelhouse, a production manager of Rubery Owen, left for South Africa on Monday to advise on production and the equipping of the factory.

A new company—Ruberowen (South Africa), Limited—is to be formed to supply the components made at the factory to the South African motor industry. The board, when it is appointed, will consist of representatives of both parent concerns.

Law Cases

Smoke Emission Charges Withdrawn

APPLICATION by Rotherham Corporation to withdraw summonses against five miners for alleged smoke emission offences in a smokeless zone was agreed at Rotherham, but not before the chairman of the magistrates, Mr. J. H. Dickinson, had criticized the application as "grossly unfair." Mr. A. S. Wait, for the corporation, said the five summonses were adjourned several months earlier in the hope that the problem of concessionary coal to miners would be settled. But it appeared that there had not been any progress at national level and the corporation felt that the blame did not rest on individuals. As there was no sign of a settlement it would be unfair to proceed with these cases.

Mr. Dickinson: "You are asking permission to withdraw these but we have already had one case in which the defendant was convicted. To me it seems grossly unfair that that man should have a conviction on his sheet whereas you are now asking for the withdrawal of these."

Mr. Wait replied that the offences were made out in law and therefore the corporation could proceed and presumably get a conviction which would mean there would be six people instead of one to whom it would be unfair.

Agreeing to the withdrawal, Mr. Dickinson added: "These summonses should not be issued as a means of bargaining at any level."

MIDLOTHIAN COUNCIL SUES COAL BOARD

EVIDENCE in Midlothian County Council's £24,869 damages action against the NCB, in which it alleges damage was done to its main outfall sewer at Smeaton Glen as the result of subsidence, is to be heard by a judge in the Court of Session, Edinburgh. This is the effect of a judgment given by Lord Kilbrandon.

The county council claims that 370 yds. of sewer were damaged, because of wrongful action by the Coal Board in working a seam under the sewer and withdrawing support from it. A section of the original sewer had to be replaced by steel pipes supported on piers which allowed for periodic adjustment to counteract further subsidence. The council had incurred outlays amounting to the sum sued for.

The board, denying liability, contends that the line of the sewer was chosen by the council without notice being given to the board, which had given the council full information about its plans to work coal in the area. The board also maintains that it was under no obligation to provide support for the sewer. If it were obliged this could only be done by curtailing its workings and sterilizing extensive areas of coal under the line of the sewer. This would result in the NCB sustaining serious loss.

£1,593 FOR LOST FOOT

MAINTENANCE man, Mr. J. C. Harrison, aged 26, who lost a foot when it was caught in a coal conveyor at Wharncliffe Woodmoor Colliery (Yorks) in 1955, was awarded total damages of £1,593 by Mr. Justice Streatfeild at Sheffield Assizes. The judge found that the National Coal Board and Mr. Harrison were equally responsible for the accident.

Mr. Harrison was working as a maintenance man on the conveyor when the belt broke, the judge said. Mr. Arthur Bird, who controlled the switches on the conveyor, stopped the motors after Mr. Harrison called out to him. Mr. Harrison had not told Mr. Bird to switch off an isolating switch which would have stopped the conveyor being started accidentally.

A 16-year-old boy, who was working as a cleaner on the conveyor, started it while Mr. Harrison was repairing the belt, and Mr. Harrison's foot was badly injured when it was drawn into the roller at the end of the machine. It was later amputated.

PIT FALL CLAIM

WHOLE issue in a case in which an injured miner claimed £400 damages from the National Coal Board turned on a difference of 2 ft., Judge Ernest Ould was told at Rotherham County Court. The miner, Mr. Harold Dungworth, was injured in a fall of roof at Kilnhurst Colliery (Yorks).

His counsel, Mr. H. G. Bennett, said Mr. Dungworth was one of a ripping team working in the south main gate in the Haigh Moor Seam, and his case was that the accident would not have happened if a permanent support had been in position as it should have been. It was known to be a dangerous place, and it was more than normally vital that permanent support should be set as soon as possible.

One of the men in the team, an accident site observer, took measurements and confirmed that there was a space of 9 ft. between the new ripping lip and the last support. The Coal Board's case appeared to be that at the time of the accident the distance was 7 ft. The whole issue turned on that measurement, he said.

The case was adjourned.

WINDING-UP PETITIONS DISMISSED

IN the Chancery Division Mr. Justice Buckley has dismissed by consent petitions for the compulsory winding-up of Wright & Platt, Limited, ironfounders, engineers' pattern makers, etc., of Edgbaston, Birmingham, and nine associated companies. Mr. Raymond Walton, for Barclays Bank, Limited, said the group's total indebtedness to the bank was secured by cross-guarantees.

The petitions had been standing adjourned since May 30 to enable the group to raise money to pay out the bank. That in fact had not happened, but with the co-operation of the bank, the companies, and the "moving spirit" in the group, a debenture over the assets of the principal company had been transferred to the bank which had put in its own receiver.

SLEPT IN PIT

COLLIERY oncost worker, William Smart (20), was fined £12 with the option of 60 days imprisonment at Kirkcaldy Sheriff Court when he admitted a charge of sleeping underground at Michael Colliery, East Wemyss (Fife), on May 17. The fiscal said that the colliery undermanager was making a routine inspection when he found three men asleep in the pump house of No. 3 pit bottom. One of them was the accused. The undermanager went off to get a witness and when he returned a few minutes later only Smart was still asleep. The other two had wakened up.

Smart said in court that it was only his second day back at work after being off ill. He was not feeling normal and the conditions in the pump house were too much for him.

PIT LOCKER THEFTS

"EPIDEMIC of pit locker thefts" was referred to at Mansfield Magistrates' Court when Roy Clayton, 23-year-old unemployed labourer, made his

third appearance in connection with a series of thefts from pithead lockers. Chief Superintendent J. A. Reddish said that a diary listing 76 collieries had been found in Clayton's pocket and the area covered Yorkshire, Derbyshire, Nottinghamshire, and even Workington.

Following numerous thefts from collieries plain clothes policemen kept watch on Friday nights. As a result, Clayton was arrested at Blidworth Colliery. A further remand was granted.

DEFENDANT COMMENDED

IMMEDIATELY apprentice miner, Richard McNicholas, discovered that he had inadvertently taken a cigarette and a match underground at Maltby Colliery, Rotherham (Yorks), he reported it to a deputy.

Although McNicholas was fined £2 at Rotherham Magistrates' Court, Mr. Harry Dunk, prosecuting for the National Coal Board, said the defendant should be commended for his honesty and "fearless action" in reporting the matter.

Board Changes

BELL'S ASBESTOS & ENGINEERING (HOLDINGS), LIMITED—Mr. J. D. Taylor has joined the board. He remains secretary of the company.

SKEFCO BALL BEARING COMPANY, LIMITED—Mr. J. L. Dickinson, company secretary and hitherto a special director, has been elected to the board.

J. & E. HALL, LIMITED—Lord Dudley Gordon is to retire from the board at the end of September. He will also retire as president of Hall-Thermotank, Limited.

BURT, BOULTON & HAYWOOD, LIMITED—Mr. M. T. Cook has been appointed to the board. As Mr. C. W. Tyrrell has taken up full-time duties with another group, he has resigned from the board.

HOOVER, LIMITED—Mr. Oscar M. Mansager has been appointed deputy chairman. He is a director and executive vice-president of the US parent company and has been a director of the UK company since 1954.

L.S.B. COMPONENTS, LIMITED—Mr. V. G. P. Weake, chairman of the parent company—Derritron, Limited—has been made chairman. Mr. W. E. Doran remains managing director and Mr. C. T. Chapman and Mr. F. P. Parfitt have joined the board.

LIMMER & TRINIDAD LAKE ASPHALT COMPANY, LIMITED—Mr. R. W. Holloway, for reasons of health, will cease to act as managing director at the end of the year. It is hoped that he will be able to continue to serve in a non-executive capacity.

Amalgamation of Nuclear Power Groups

FURTHER discussions between Atomic Power Constructions and the GEC-Simon-Carves Atomic Energy Group have resulted in an agreement under which they will join forces to design and build nuclear power stations in this country.

It is expected that Mr. Arnold Lindley, GEC's vice-chairman and managing director, will be chairman of a new company with a nominal capital and that Col. G. W. Raby, managing director of Atomic Power Constructions, will be managing director of the new undertaking.

Anglo-European Coal Trade

REPRESENTATIVES of European coal producing, exporting, and importing countries have been meeting in London this week to discuss mutual problems at a two-day conference organized by the British Coal Exporters' Federation.

This Anglo-European Coal Trade Conference, like the conferences previously held in 1958 and 1959, provided an opportunity for oversea—and primarily West European—buyers of British coal to meet in London for private discussion of general issues of mutual interest. A number of study groups met to discuss particular problems. The conference was sponsored by the British Coal Exporters' Federation, with the co-operation of the National Coal Board and the British hard-coke and gas-coke producers.

A dinner was held in London's Guildhall on Wednesday, over which Mr. Charles Carlow, president of the Federation, presided. Mr. Richard Wood, Minister of Power, was the chief guest. Apart from official oversea delegates there was a large number of West European coal buyers present as private guests of British coal exporters with whom they have long-standing commercial connections.

MP's Plan to Tackle Spoil Heaps

PLAN which could change the face of much of the South Yorkshire countryside may be taken up by the Civic Trust. Mr. Roy Mason, Labour MP for Barnsley, has been pioneering a scheme to divert opencast mining machinery to the work of levelling colliery spoil heaps. Mr. Mason said that it was hoped to get a large firm to experiment on one pit heap so that some idea of cost could be obtained. "It would keep men and machines in work and also benefit the landscape," he said.

A representative of the Civic Trust is to meet Mr. Arthur Bates, West Riding County Council planning officer, sometime this month to discuss the project. Full support for south Yorkshire's effort to tackle the spoil-heap problem was promised by Derbyshire Urban Councils Association last week.

FUEL TECHNOLOGY COURSE AT SHEFFIELD

ONE of the largest residential courses to be held at Sheffield University is to take place from July 10 to 16. The course, on liquid fuel combustion, is organized by the Department of Extra-Mural Studies in co-operation with the Department of Fuel Technology and Chemical Engineering. Nearly 200 executives from major industrial firms throughout Europe will be present.

Lecturers will include Prof. M. W. Thring, head of the university's department of fuel technology and his colleagues, Dr. C. Hulse and Mr. K. Littlewood; Dr. P. Eisenklam and Dr. D. G. Martin, of the Imperial College of Science and Technology, and Mr. J. M. Beer, principal investigator at the International Flame Research Foundation, Ijmuiden, Holland.

DUBILIER CONDENSER COMPANY (1925), LIMITED—Mr. Wilfred J. Foster has been appointed an ordinary director.

NEWS IN BRIEF

NOISE from compressors used for pneumatic equipment has been cut by 50 per cent. on a site in London by the use of an electrically-operated rotary-type 175-RE2 "Power Vane" compressor, made by the Consolidated Pneumatic Tool Company, Limited.

"GROUP RELATIONS" will be the subject of a one-day conference being organized by the British Institute of Management at the Connaught Rooms, London, W.C.2, on July 14. It will be an explanation of a technique of management training little used in this country.

A CENTURY of machine-tool manufacture was celebrated last week by Charles Taylor (Birmingham), Limited. A plaque commemorating the occasion at the firm's Bartholomew Street works was unveiled by Mr. William Taylor, joint managing director and grandson of the founder.

AFTER successful negotiations with US firms and the authorities, the China International Foundation, a Nationalist body based in the US, has given its support to the erection of a steel plant in Taiwan. The project will need an outlay of US $50,000,000, of which 4 to 10 per cent. will be from Chinese investment.

B.P. TANKERS, LIMITED, has contributed £20,000 towards the cost of building and equipping a marine engineering training centre at South Shields Marine and Technical College. In addition to monetary assistance, B.P. Tankers has also supplied 120 tons of auxiliary machinery from one of its tankers scrapped last year.

OPENING of the British Scientific and Precision Instrument Exhibition in Moscow on Saturday by Sir Patrick Reilly, British Ambassador, was attended by Russian buyers and scientific and instrument-making specialists. Nearly £500,000 worth of equipment is displayed, about three-quarters of which is expected to be sold on the spot.

AWARDS ARE TO BE MADE in Birmingham today (Friday) to the three apprentices chosen for the title of Apprentice of the Year, organized by the British Junior Chambers of Commerce. The technical winner will go to Australia for 12 months, the craft winner to Germany for six months, and the commercial winner to the US for six months.

GRANT OF £25,000 has been made by Mullard, Limited, makers of scientific valves and instruments, of London, W.C.1, towards a new laboratory for research into the behaviour of materials at temperatures approaching absolute zero. The laboratory is to be built at Oxford University and will extend the work being carried out at the Clarendon Laboratory.

NEW BOILER shop with rollers and presses is to be built by Henry Balfour & Company, Limited, near its recently opened research and development centre at Leven, Fife. Cost will be about £200,000. Leven works of Enamelled Metal Products Corporation (1933), Limited, a subsidiary making specialized glass-lined equipment, is also to be enlarged at a cost of about £80,000.

SUMMER SCHOOL for 30 professors of electrical engineering from leading universities and technical colleges in Britain, together with three oversea visitors, has been arranged by Associated Electrical Industries (Rugby), Limited, from July 11 to 15 at Rugby. Lectures on the latest developments in electrical and electronic engineering will indicate how the latest scientific and mathematical knowledge is being applied in the manufacture of electrical equipment. The opening session will be addressed by Sir Willis Jackson, FRS, a director of Metropolitan-Vickers Electrical Company, Limited, and Sunvic Controls, Limited, and president of the Institution of Electrical Engineers, who will speak on "The Relation Between the Industry and the Universities."

MANCHESTER SALES OFFICE of Richard Hill, Limited, manufacturers of steel wire rods, etc., of Middlesbrough, a member of the Firth Cleveland, Limited, group of companies, will be at 19b School Road, Sale, Cheshire, as from next Friday. A reinforced concrete design office is to be opened at the same address under the supervision of Mr. D. H. Halstead as chief engineer.

REFERRING TO THE recent change of name from the Salem Engineering Company, Limited, to Salem-Brosius (England), Limited, the company states there is no change in its management or in the board of directors. The change of name is intended only to indicate its close relationship with Salem-Brosius Inc. of Pittsburgh, USA, and its associated companies throughout the world.

UNDER AN AGREEMENT just concluded between International Harvester Company of Great Britain, Limited, and S.A. de Construcciones Agricolas of Seville, a version of the IH B-275 tractor is to be manufactured under licence in Spain. Initially the Spanish company will import a large majority of the B-275 tractor components from the IH Bradford Works, but ultimately the tractor will be wholly produced in Spain.

SUNDERLAND firm of William Doxford (Engineers), Limited, is to build a turbo-charged marine oil engine of 19,800 h.p. which, it is claimed, will deliver more power per cylinder than any other engine in the world. On Thursday of last week visitors to the factory, including the Minister of Transport, Mr. Ernest Marples, saw the prototype 10,000 h.p. engine undergoing a 1,000-hour continuous running test on heavy fuel oil.

PROBLEMS of oversea trade of smaller firms will be the subject of a conference of one or more days being planned for the autumn by the East and West Ridings Regional Council of the Federation of British Industries. Aided by a panel of experts, executives, will be invited to discuss market research, methods of selecting agents, credit facilities, patents and agency agreements, and the sources of assistance available to small companies.

RIGHTS TO ALL UK patents and applications of the Sprague Electric Company, of the USA, have been acquired by the Telegraph Condenser Company, Limited, electrical condenser manufacturers, of London, W.3. Sprague will make available to TCC all its research and technical information, and for the next 21 years the two companies will exchange technical and manufacturing knowledge embracing all products of the two companies.

MAIN ROAD through Coventry was closed for several hours recently while a bridge linking two sections of the factory of Courtaulds, Limited, was erected. The operation was carried out under the supervision of Redpath Brown & Company, Limited, using two Smith M.E.1 22½-ton mobile lorry cranes made by Thomas Smith & Sons (Rodley), Limited, a subsidiary of Thos. W. Ward, Limited, Sheffield. The main bridge section was 90-ft. long and weighed 10 tons, yet it was in position on its supports in under three hours.

Orders Placed

Steel Plant Order for Wellman-VOEST

CONTRACT has been placed by John Lysaght's Scunthorpe Works, Limited, Scunthorpe, with the Wellman Smith Owen Engineering Corporation, Limited, of London, S.W.1., in collaboration with VOEST, AG, of Austria for the design and supply of a complete L.D./A.C. oxygen steelmaking installation at Scunthorpe. Total value of the order exceeds £2,500,000.

The plant will include a 1,000-ton hot metal mixer, two 50/60-ton converters, cranes and handling machines, waste heat boilers, gas-cleaning plant, buildings, and ancillary equipment. It is designed initially for the production of 400,000 tons of ingots a year, with provision for extension to 800,000 tons.

The Lysaght contract is the third major oxygen steelmaking installation placed with Wellman and VOEST since their agreement last November for exclusive collaboration in the UK for the design and supply of plant and equipment for the L.D. steelmaking process.

ORDERS for 1,100 Mayrath screw conveyors have been received by Gordon Felber & Company, Limited, for shipment to Australia and Italy. They will be used for handling grain and light granulated industrial materials.

INSTALLATION of three large boilers at Uskmouth "B" power station (Mon) is to be undertaken for the Central Electricity Generating Board by the Darlington Insulating Company, Limited. It recently completed a similar contract at Uskmouth "A" station.

TENDER of £10,863 by Davey, Paxman & Company, Limited, manufacturers of diesel engines, boilers, etc., of Colchester (Essex), for the supply of a diesel alternator for the new Lartington gravity filtration plant has been accepted by the Tees Valley and Cleveland Water Board.

LONDON TRANSPORT has placed an order worth some £2,500,000 with Cravens, Limited, the Sheffield railway rolling stock builders, for the bodies and bogies of a further 27 "silver" tube trains. In total, the 216 cars which make up the new trains will be worth some £4,000,000, but orders for the motors and other equipment have yet to be placed.

FURTHER CONTRACT for the supply and installation of overhead equipment for 25 kV 50 cycles AC railway electrification has been placed with British Insulated Callender's Cables, Limited, London, W.C.1, by the Indian Railway Board. The equipment is similar to that being installed by BICC for the South Eastern Railway and the order is worth £1,200,000.

TWO YEARS AGO the Indian branch of the Cementation Company, Limited, was awarded the £100,000 contract for the grouting of the Walwhan Dam for the Tata Power Company, Limited. Now the company has secured the order for the rest of the remedial work on the dam. Using the Coyne method, Cementation will tie the dam to the bedrock with high tensile steel cables. With another Tata contract—the grouting of the Shirawta Dam—the value of the additional work is about £400,000.

SUBSTANTIAL quantity of MR2 super duty firebricks to line the lower part of the stack of the No. 1 blast furnace at Newcastle, New South Wales, of the Broken Hill Proprietary Company, Limited, has been ordered from Morgan Refractories, Limited, Neston (Ches), a member of the Morgan Crucible Company, Limited, group. It is believed to be the first time that a bulk order of super duty firebricks for a blast-furnace lining has been sold oversea from the UK. The order is worth £25,000.

EIGHT GASHOLDERS, worth about £1,000,000, have been ordered from P. G. Engineering, Limited. The most recent is for a 3,000,000-cu. ft. ABP Klonne type holder to store blast-furnace gas at John Lysaght's Scunthorpe Works, Limited. Through P. G. Engineering's associated company, Ashmore, Benson, Pease & Company, Limited, Richard Thomas & Baldwins, Limited, has ordered two new holders for its Spencer works at Llanwern (Mon). One will store 5,000,000 cu. ft. of blast furnace gas and the other 2,000,000 cu. ft. of coke-oven gas. An Indian fertilizer factory has ordered five column-guided holders, one of 15,000-cu.m. capacity and the other four of 5,000-cu.m. capacity.

First Safety Week at a North Wales Pit

CENTRE of attraction on Saturday for several hundred members of the public including miners and their families was Bersham Colliery, near Wrexham, in the North-Western Division of the National Coal Board. The colliery surface was thrown open because of the colliery's safety week—the first ever to be held in a North Wales pit.

A full-size replica of a coal face and its approaches was erected above ground and prizes were offered for those spotting the 100 deliberate faults and breaches of safety rules demonstrated.

The week was officially opened on Saturday by Mr. J. C. Fletcher, North-Western Division's safety engineer, who said that although the number of serious pit accidents was decreasing, the number of minor accidents was increasing. This was contrary to the trends in other industries and was rather disconcerting. He made a plea to miners to regard the safety week as a challenge to reduce the number of pettyfogging accidents which averaged more than 30 a month last year at Bersham.

Speaking about the future of the coalfield, Mr. Gordon Nicholls, North Wales Area general manager, said that it was hoped to resume recruitment of men to local collieries in the next few weeks.

No Plans to Shut Down Small Shipyards

NO PLANS are being made by the Government for rationalization in the shipbuilding industry which would result in the closing of small yards, said Mr. Ernest Marples, Minister of Transport, in Sunderland on Thursday of last week. "Fears of smaller yards being closed are founded on rumours—they are just not correct," he said.

Mr. Marples, who was on the last stage of his fact-finding tour of Clydeside and the North-east, said that during his tour of the Tyne and Wear he had been impressed by the individuality of the shipyards. Each varied greatly from its neighbours, and he thought this was a good thing because each was doing a different class of work. Mr. Marples saw a modernization scheme costing £5,000,000 at the North Sands shipyard of Joseph L. Thompson & Sons, Limited, and also visited the shipyard and engineering works of William Doxford & Sons, Limited.

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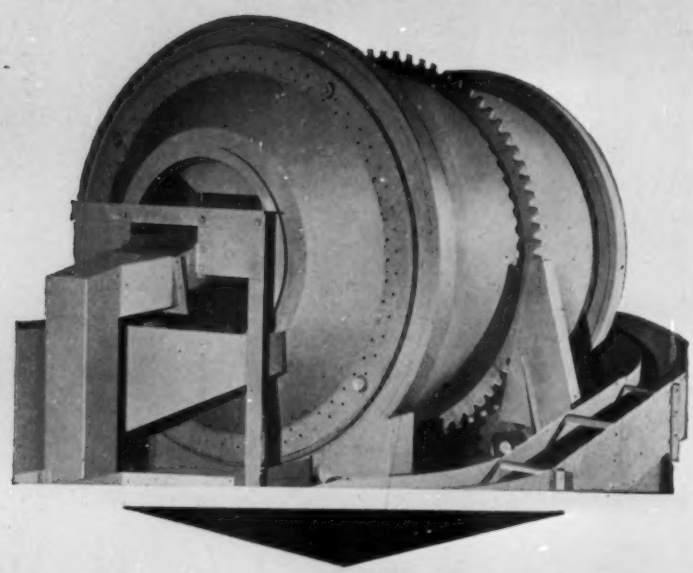

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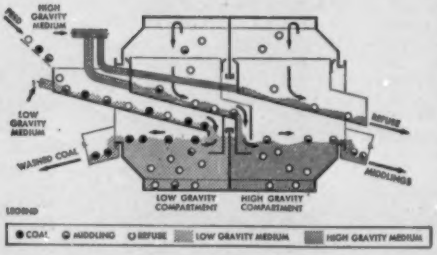

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W. H. Allen Chief's Doubts on Trade Practices Act

REFERRING to the Restrictive Trade Practices Act, Mr. Kenneth Allen, chairman of W. H. Allen, Sons & Company, Limited, mechanical, hydraulic, and electrical engineers, of Bedford, says in his annual statement to shareholders that he wonders whether the interpretation of the Act by the Courts "may not lead to more harm than good being done to British industry."

"To ensure that practices are not against the public interest is desirable. On the other hand, nothing could be more against the public interest than to prevent reasonable commercial co-operation between companies if this leads to advancement in expansion, modernization, research, and technical progress, none of which is possible without adequate profit which could be adversely affected by cut-throat competition. We believe in competition, but not in cut-throat competition."

Mr. Allen states that the directors anticipate that the company's current year's profits will not differ substantially from those for 1959. In that event it is intended to recommend not less than 10 per cent. on capital as proposed to be increased by a one-for-two scrip issue. This would be equivalent to 15 per cent. on the present capital, against the effective 14 per cent. (12 per cent. previously) recommended for 1959. Shareholders are told that the fact that the modernization and expansion programme is now reaching completion, has enabled a more liberal dividend policy to be adopted.

Capital expenditure during 1959 amounted to £355,000 and outstanding commitments totalled £154,000 as at end-December. Further expenditure of £500,000 is contemplated for modernization and expansion during 1960 and 1961. The demand for capital goods is lower than two years ago, but the company will be fully employed through 1960.

Fall in Richardsons, Westgarth Profits

DUE to the difficult state of trade in the marine and land engineering industries in which the Richardson, Westgarth & Company, Limited, group is engaged, group profits fell from £1,075,651 to £516,900, before tax, in the year ended March 31, 1960. The directors add that a satisfactory number of orders have been received during the year, but not always at satisfactory prices. The dividend is maintained at 10d. a 10s. share.

The provision for trading contingencies is substantially increased from £23,499 to £211,698 and this is in respect of unprofitable marine contracts which, although not in progress to any appreciable extent by the end of the year, have had to be taken at unprofitable prices to fill gaps in production programmes.

Profits of the subsidiary, the Humber Graving Dock & Engineering Company, Limited, which placed £500,000 debentures in March, totalled £113,271 in the year ended March 31, 1960, against £185,033.

WELDING EXHIBITION is being held by Murex Welding Processes, Limited, Waltham Cross (Herts), at the Rutherford College of Technology, Newcastle-upon-Tyne, from July 5 to 9. It is one of a series being held at various centres.

Recent Wills

CHILDS, JOHN, coal merchant, of Ongar (Essex)	£18,164
TODD, MURRAY, former iron and steel merchant, of Hoylake (Ches)	£71,065
LESTER, A. W., managing director of the Walsall District Iron Company, Limited, and son of the founder of the company	£82,817
LAMBERT, R. L., formerly a clerk at Lindley Lodge, headquarters of the Warwickshire Area, West Midlands Divisional Coal Board	£5,594
DAVIS, J. T., formerly a director of John Thompson Motor Pressings, Limited, a subsidiary of John Thompson, Limited, Wolverhampton	£12,436
LEAVER, C. C., chairman of Leavers (Fuels), Limited, Maidstone, and past president of the Kent and East Sussex Coal Merchants' Association	£9,278
CRITTALL, R. G., formerly vice-chairman of Richard Crittall & Company, Limited, heating, ventilation, and air-conditioning engineers, of London, W.1	£41,722
DOUGLAS, MARK, managing director of Morgan Refractories, Limited, Wirrall (Ches), a subsidiary of the Morgan Crucible Company, Limited, and previously with the Consett Iron Company, Limited, and the Steetley Lime & Basic Company, Limited	£8,002
MORGAN, FREDERICK, retired colliery contractor, of Porthcawl (Glam)	£18,141
WOOD, GEORGE, vice-president and former chairman of Thos. W. Ward, Limited, and a well-known expert on iron and steel scrap and shipbreaking	£77,080
WOOD, J. W., managing director of the Uskside Engineering Company, Limited, Newport (Mon), a subsidiary of the Guest Keen & Nettlefolds group, and a director of Welsh Metal Industries, Limited, Caerphilly (Glam)	£25,822
BLAGDEN, VICTOR, founder and former chairman of Victor Blagden & Company, Limited, chemical merchants and steel drum reconditioners, of London, E.C.3, and a former director of Burt, Boulton & Haywood, Limited	£216,513
MCLINTOCK, DR. W. F. P., director of the Geological Survey and Museum of Practical Geology from 1945 to 1950	£14,046
INTESTATE	
BARNES, G. F., engineer-in-charge at Coventry Colliery (Warwickshire)	£1,485

Beardmore's Armour Mill to Close

DECISION to close the armour section rolling mill of the Glasgow steelworks has been taken by William Beardmore & Company, Limited. The mill is used to produce armour plating for battleships. The managing director, Mr. P. M. Thomas, said last week that with the end of the battleship era the mill was no longer required and it would be closed towards the end of the year.

"We have told our shop stewards," he said, "and we will try to place as many as possible of the men concerned in other departments, but, of course, we can make no promises."

New Zealand to Probe Steel Industry Prospects

COMPANY to investigate the potential of an iron and steel industry based on the country's iron sands is to be formed by the New Zealand Government, it was announced on Tuesday.

The Minister of Industries and Commerce, Mr. Philip Holloway, said that earlier plans for a company with the Government holding 51 per cent. interest and private investors holding 49 per cent. had been abandoned because of insoluble differences, and the Government would "go it alone."

Chairman of the new company will be Mr. W. Fisher, managing director of Fisher & Paykel, of Aukland.